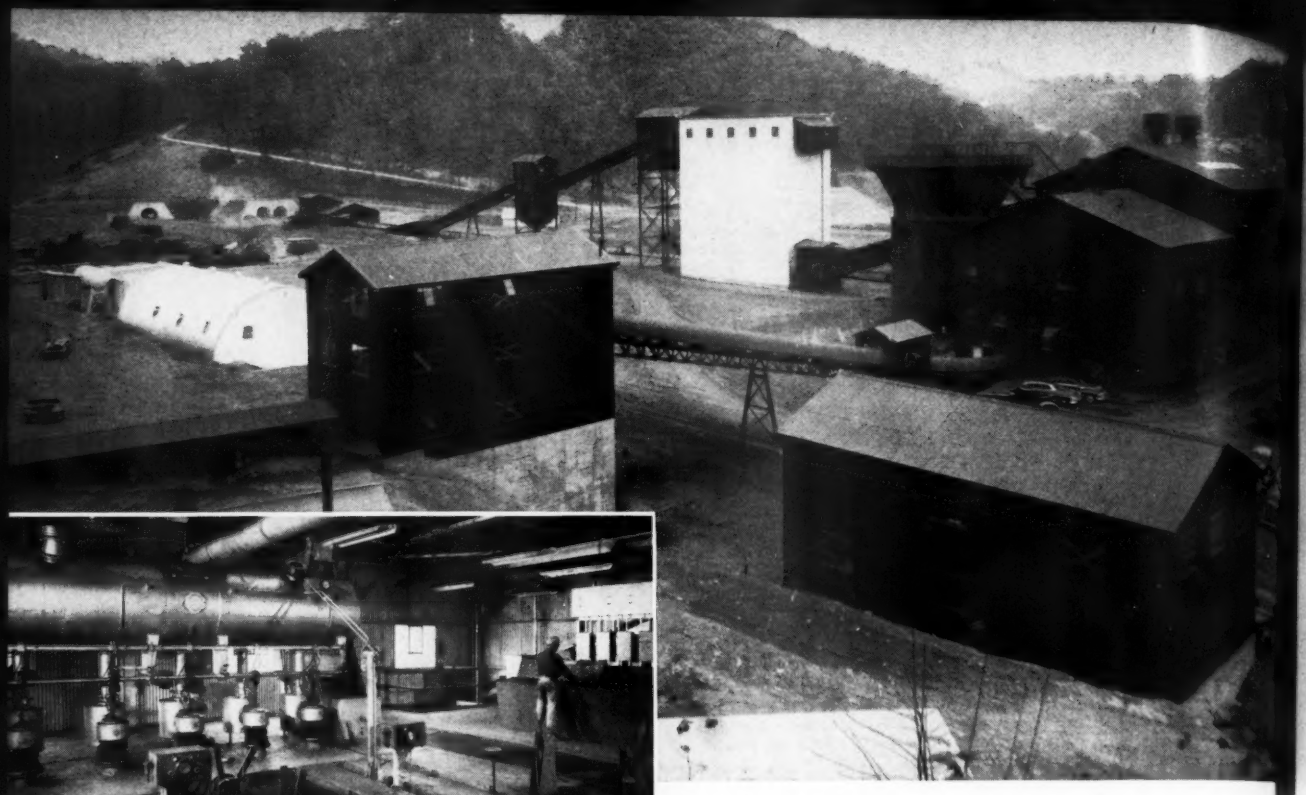
Mining CONGRESS JOURNAL

SEPTEMBER
1952



National Mines gets flexible, high-capacity cleaning with their tw Link-Belt Air-Pulsated Washers (left). Coal moves to river and ra loading station on a single, 10,900 ft. Link-Belt Belt Conveyor, th world's longest. Link-Belt also supplied National's mine car dumpe crusher, screens, feeders, barge shifter and all belt and flight conveyo and drives.

Another example of LINK-BELT's unified responsibility at work

Here's how National Mines relies on Link-Belt Engineering . . . Link-Belt Equipment . . . to produce clean, uniform metallurgical coal at lower cost . . .

LINK-BELT offers unique advantages as a proved source of unified responsibility in building a coal preparation plant. Link-Belt engineers have a vast background of experience with both large and small installations. And Link-Belt designs, manufactures, installs and accepts complete responsibility for the entire system . . . down to the last detail.

National Mines, for example, called on Link-Belt to build their new washing and blending plant at Morgantown, W. Va. They capitalized on Link-Belt's broad line of quality preparation and handling equipment . . . on Link-Belt's unmatched engineering.

Result: National loads 216 tons of 4" x 0" clean uniform coal per hour . . . at the lowest possible overall cost per ton. From mine car dumping to rail and barge loading, their Link-Belt equipment gives efficient, trouble-free service.

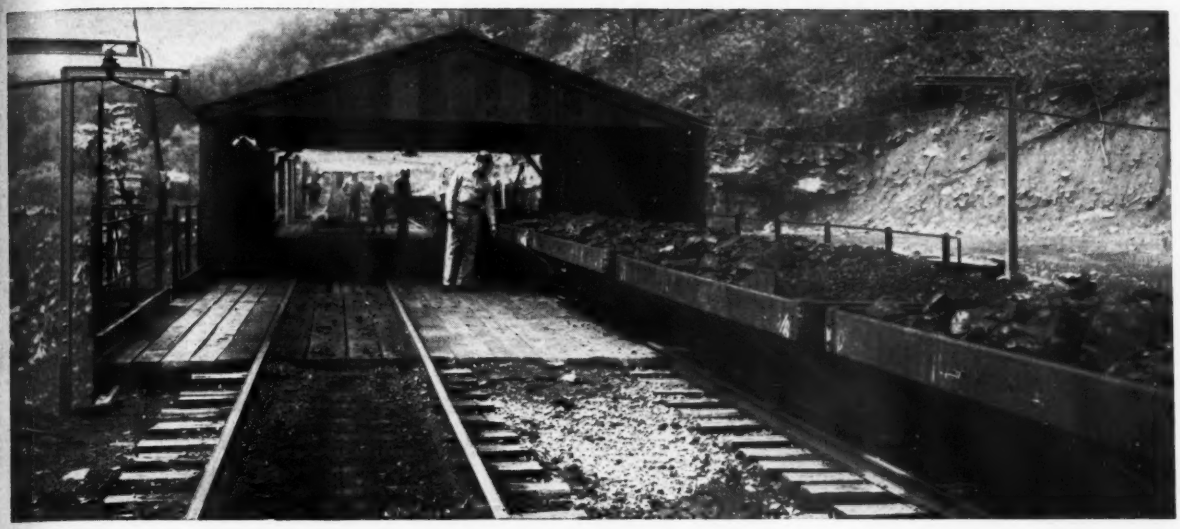
If you're contemplating new facilities or modernization of your existing preparation plant, call the Link-Belt office near you. Our engineers will be glad to show you how Link-Belt's complete, unified responsibility can help you produce a more marketable product . . . at a lower price per ton.

12,978

LINK-BELT

COAL PREPARATION and HANDLING EQUIPMENT

LINK-BELT COMPANY: Chicago 9, Philadelphia 40, Pittsburgh 13, Wilkes-Barre, Huntington 9, W. Va., Louisville 2, Denver 2, Kansas City 8, Mo., Cleveland 15, Indianapolis 6, Detroit 4, Birmingham 3, St. Louis 1, Seattle 4, Toronto 8, Springs (South Africa).



RED JACKET

TRADE MARK REGISTERED

RED JACKET'S NO. 17 . . .

ANOTHER MODERN MINE INSTALLS THE S-D AUTOMATIC HAULAGE SYSTEM FOR MORE EFFICIENT, ECONOMICAL OPERATION

Red Jacket's Modern No. 17 Mine is another typical example of how modern mines are making a major reduction in coal production costs by installing the S-D Automatic Haulage System. At No. 17 this modern haulage system comprises three 15-ton locomotives, 250 S-D "Automatic" Drop Bottom Cars and a 450-ton capacity Surge Bin. Coal and slate cars are often mixed in the same trip of about 20 cars. An average haul from the mine to Surge Bin is about 3 miles.

DETAIL INFORMATION ON THE S-D HAULAGE SYSTEM AT NO. 17 MINE

NUMBER OF S-D "AUTOMATIC" DROP BOTTOM CARS:

200 16 foot (6 ton capacity) cars for transporting coal.

50 12 foot (4 ton capacity) cars for transporting slate.

Car Wheels: S-D "Floater" Ball Bearing.

Method of Loading Cars: Mobile loaders to Shuttle Cars to Elevating Conveyors to S-D "Automatics".

Average Trip: 20 cars.

Average Haul: 3 miles.

Track Gauge: 48 inches.

SURGE BIN CAPACITY: 450 tons.

Construction: Concrete.

Bin Length: 52 feet.

Bin Width: 25 feet.

Tracks Over Bin: Two (Bin loaded by trips entering from either direction).

COAL HANDLED BY THE 250 S-D "Automatics":

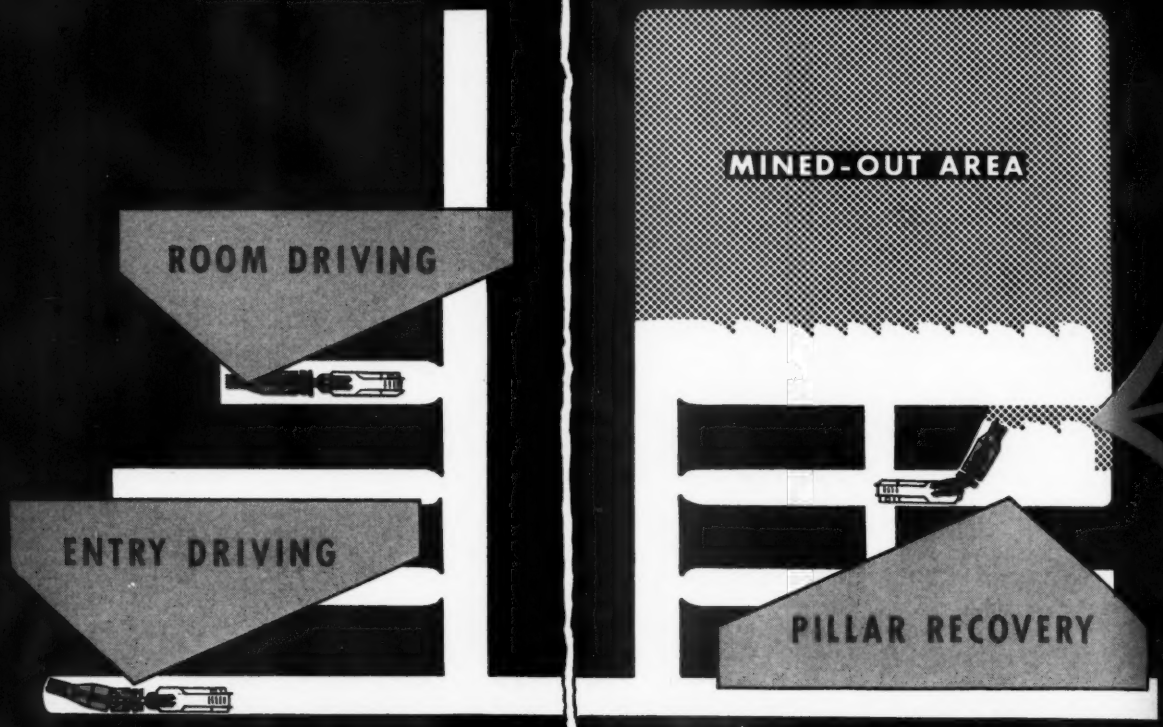
4,000 tons per day.

As each trip approaches the Surge Bin the slate cars are independently emptied at a slate bin. Trip continues non-stop over Surge Bin where coal cars are automatically emptied, then returns back to the mine. This fast, dumping-on-the-move haulage operation saves hundreds of man-hours by eliminating manual dumping. It saves thousands of dollars involved in maintaining expensive rotary dump equipment. It saves hundreds of hours in down-time because, in the S-D System, should a breakdown occur it is not necessary to shut down the whole system until repair is made. In addition, this system reduces mining and cleaning plant operation costs because it permits each to operate independently of the other. One shift operation of the preparation plant is often sufficient to take care of two shift operation of mine. Any cleaning plant works at the least cost with an even continuous supply of coal. The Surge Bin continues to supply coal to preparation plant when, for any cause, there is a delay at the face. Breakdowns or delays at the preparation plant need not stop mine production because the Surge Bin will take the coal until repairs are made.

This continuous supply of coal from the face to the preparation plant, guaranteed by the S-D Automatic Haulage System, is absolutely necessary to produce coal at the lowest possible cost. This system is recognized as the leading method of cutting coal mining costs today! We welcome an inquiry from you. Sanford-Day Iron Works, Inc., Knoxville, Tennessee.

SANFORD-DAY IRON WORKS

THE FLEXIBILITY THAT MEANS PEAK EFFICIENCY!



YOU GET GREATEST COAL RECOVERY

with the JOY CONTINUOUS MINER

A Joy Continuous Miner can operate in any mine it can enter. Thin seams, thick seams, split seams—all can be efficiently worked with this powerful, versatile machine that gets your coal without shooting . . . requires only the necessary additional equipment to transport the coal out of the mine.

Not only does the Continuous Miner do a quick, thorough job driving entries and rooms, it's also topnotch at pillar-recovery. These three main functions are illustrated in the drawing at the top of the page at left. Note how the Miner-and-shuttle-car team retreats after driving up a room, taking pillar as it comes back. The photo opposite shows a JCM on pillar recovery in a midwestern mine.

The Joy Continuous Miner is built in two models and four heights. The 3-JCM can be either 34″ or 39½″ high, and will mine from 6″ below to 66″ above bottom. The 4-JCM is available in 48″ or 53¼″ heights, and will mine from 5½″ below to 98½″ above bottom. With special equipment the 3-JCM can mine to 76″ above bottom, and the 4-JCM to 120″ above bottom.

A Joy Engineer will furnish full details on the Joy Continuous Miner. He will show you exactly how it can be used for high-production mining in your operation, at absolute rock-bottom cost per ton of coal mined.

Consult a Joy Engineer

W&D CL 4150

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

Change TIMKEN® rock bit types as the ground changes

Both fit the same drill steel!

YOU can change to the most economical bit as the ground changes—right on the job—if you're using Timken interchangeable rock bits. Both Timken® carbide insert bits and multi-use bits fit the same drill steel.

When drilling in ordinary ground, use Timken multi-use bits. With correct and controlled reconditioning, they give you the lowest cost per foot of hole when full increments of steel can be drilled.

When you hit hard, abrasive ground, quickly change to Timken carbide insert bits for greatest economy. They're your best bet for maximum speed, constant-gauge holes, small diameter blast holes and very deep holes.

By using Timken carbide insert and multi-use bits, you put the best answer to every drilling requirement right at your drillers' finger tips. Both bit types are interchangeable in each thread series. And both bit types have these three important advantages: 1) made from electric furnace Timken fine alloy steel, 2) threads are not subject to drilling impact because of the special shoulder union developed by the Timken Company, 3) quickly and easily removable.

Call upon the 20 years' experience of our Rock Bit Engineering Service for help in selecting the best bits for your job. Write The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

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Contents

VOLUME 38, NUMBER 9 FOR SEPTEMBER, 1952

COVER: Miners of Pittsburgh Coal Co.'s Montour No. 4 mine at Lawrence, Pa., take their noon break in the dinner hole.

Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress

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THE AMERICAN MINING CONGRESS
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ABC
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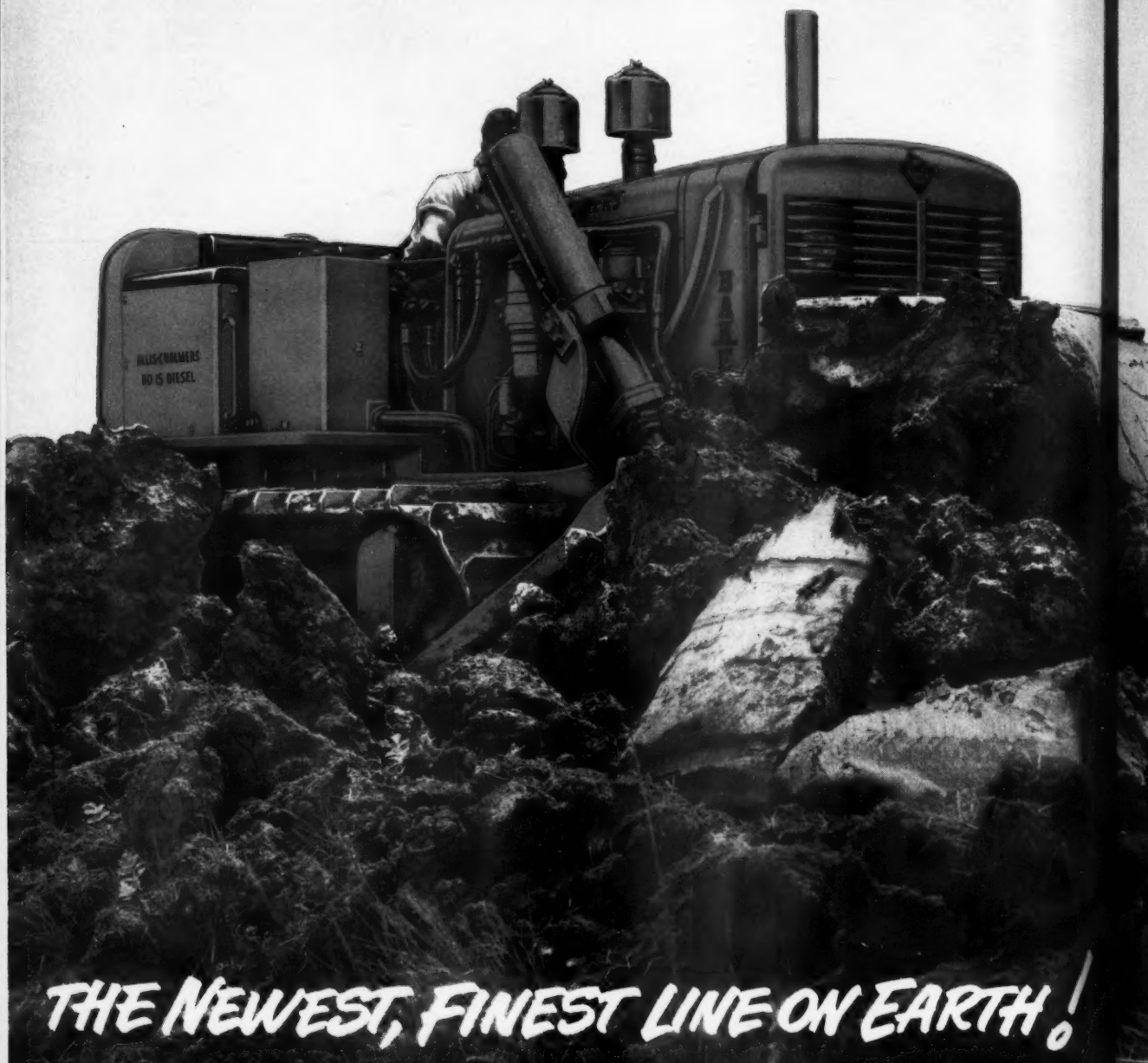
built to GET MORE DONE bu



THE NEWEST, FINEST LINE ON EARTH!

HD-5
40 drawbar hp.
11,250 lb.

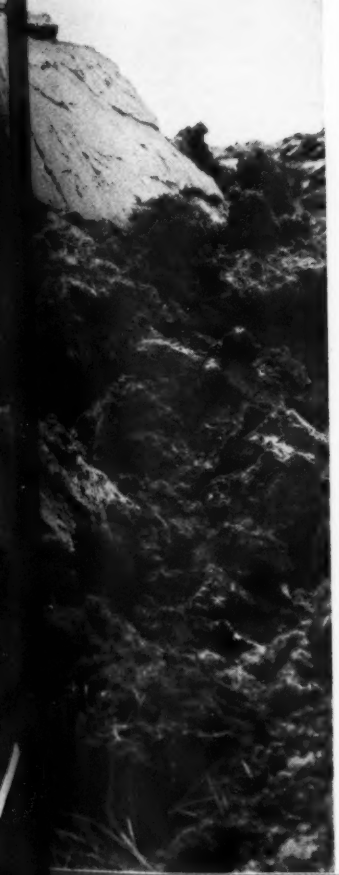
HD-9
72 drawbar hp.
18,800 lb.

HD-15
109 drawbar hp.
27,850 lb.

HD-20
Hydraulic Torque
Converter Drive
175 net engine hp.
41,000 lb.

built to TAKE IT LONGER

Built for Better Mining—ALLIS-CHALMERS HD-9, HD-15



Unequalled Lugability

The HD-9 and HD-15 build up greater drawbar pull faster . . . hold it longer than ever thought possible in gear transmission tractors.

For example, when tough going has pulled travel speed down 40 percent, these tractors will have increased their drawbar pull almost 20 percent over rated pull. They will lug down almost 45 percent from rated travel speed before drawbar pull even starts to fall off.

To take full advantage of this important GM 2-cycle diesel engine characteristic, the HD-9 and HD-15 have longer truck frames, lower idlers and sprockets. That means more track on the ground . . . better stability . . . sure-footed traction . . . unequalled *lugability.*

Extra Long Life

Here are a few of the many reasons why these newest, finest tractors are *built to take it.*

- **All-Steel Welded Construction**
- **More Power with Bigger Engines — Longer Engine Life**
- **More Weight, Greater Strength**
- **Extra Heavy Main Frames — No Extra Reinforcement Needed for Front-Mounted Equipment**
- **Long-Lasting, Large Diameter Clutches**
- **Double Reduction, Straddle-Mounted Final Drive Gears with Live Sprocket Shafts and Caged Bearings**
- **Positive Operating Track Release — Works in Oil**
- **All New, Specially Designed Track Assembly**
- **Positive-Seal Truck Wheels, Support Rollers and Idlers — Mounted on Tapered Roller Bearings, 1,000-Hour Lubrication!**

Your Allis-Chalmers dealer will be glad to explain all of these advantages. See him or phone him now.

DESIGNED FOR YOUR JOB • BUILT TO "TAKE IT" • EASY TO OPERATE • EASY TO SERVICE

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Big lift for maintenance men...

● With its hundreds of belt idler bearings, this large coal conveyor at a midwest surface mine could have presented significant lubrication and maintenance problems. That's why mine officials, acting upon the suggestion of a Standard lubrication specialist, switched to STANOBAR Grease No. 2.

STANOBAR has dispensed easily from grease guns, thus providing a big lift for maintenance men. This has served to keep time and labor for applying lubricant at a minimum. There has been no trouble from hardening or caking of the grease in the bearings, nor has leakage been a problem. Effective lubrication has prevented any bearing failures due to excessive wear and has kept power requirements for starting and moving the conveyor belt at a minimum.

Operators of this mine have found STANOBAR entirely suited for bearing lubrication in other tipple equipment, such as shaker screens. This versatility has helped simplify lubrication from both stocking and application standpoints.

STANOBAR
TRADE MARK
Grease

The experience of this mine points to savings you can make through Standard's lubrication engineering service and high quality products. How you can get this lubrication service, quickly and easily, is explained at the right. Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

What's YOUR problem?

H. Dillingham, of Standard Oil's Evansville, Indiana, office, is the Standard lubrication specialist who worked with this mine to find the right grease for a tough job. As a result of his work, the mine was able to save time and expense for the maintenance of a coal conveyor.

His on-the-job service is typical of that available to all midwest mines through a corps of such lubrication specialists. You can be sure that the specialist in your own area has both the practical experience and the training in a Standard Oil Lubrication Engineering School that will result in dependable, thorough assistance. To reach him, all you need do is phone your local Standard Oil Company Office. When he calls, be sure to discuss with him the benefits offered you by such products as:

STANOIL Industrial Oils—Simplify your lubrication jobs by using this *one* line of oils that provides cleaner operation of loader and crane hydraulic units, supplies effective lubrication in compressors, gear cases, and circulating systems.

SUPERLA Mine Lubricants—These new, improved oils and greases provide better lubrication of cutters, loaders, locomotives, mine cars, and other underground equipment. They eliminate transmission-case deposits, reduce clutch-plate gumming, and minimize wear on gears and bearings.

CALUMET Viscous Lubricants—On open gears and wire rope, these greases resist washing and throw-off. Their superior wetting ability affords better coating of gears and better internal lubrication of wire rope.

STANDARD OIL COMPANY (*Indiana*)

STANDARD

Now! A FAST WAY TO ROUTE YOUR ORE: B&O—THROUGH BALTIMORE!

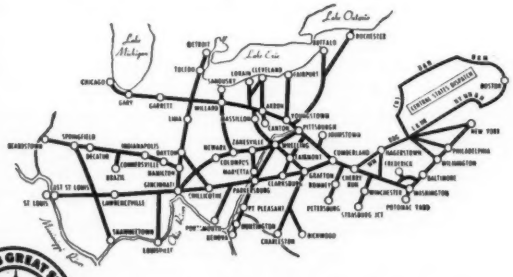
AIR VIEW OF B&O's NEW IMPORT ORE PIER

Notice the two unloaders ❶, connected by a conveyor belt with the discharge bins ❷. The ore facility is next to B&O's coal pier ❸, and to the spacious yards ❹ which accommodate about 2,000 cars.

America's most modern ore facility completed by the B&O

With a pier 650 feet long and two giant unloaders, this new $5,000,000 import ore facility is the first of its kind to be built on the eastern seaboard. Its completion makes Baltimore, more than ever, a strategic gateway for the world's ores—iron, manganese, chrome, vanadium, and others. Shippers now have numerous reasons for routing their ore through this thriving port so convenient to the steel areas. For instance:

- The new facility has a rated capacity of about 3,000 tons an hour.
- Vessels can be released and turned in the shortest possible time.
- Ore trains leaving facility can by-pass the Baltimore area's heavy traffic.
- Facility is coordinated with B&O's coal pier and supporting yards; empty cars will readily be available.
- When pier is extended, handling capacity will be doubled; two ships can then be worked at once.



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B&O®

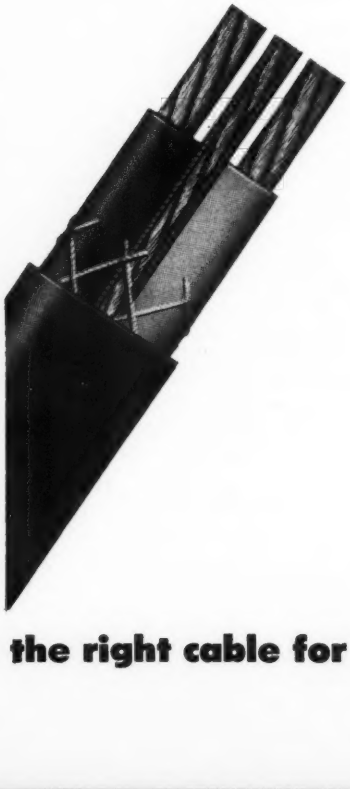
BALTIMORE & OHIO RAILROAD

Constantly *doing things* **—better!**

in shuttle car cable
there are no **"lucky"** breaks
—they all cost money!

. . . and four or five breaks can equal the cost of the cable in lost production. Since actual records show different makes have widely varying life expectancy, it pays to choose your cable carefully.

for longer "break-free" service insist on



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This ANACONDA portable power cable—the first with cold rubber insulation—won't override, kink or twist. New or aged, it has greater resistance to cutting, crushing, impact, abrasion, heat and moisture penetration than other types. It stands up well under reel tension, passes easily over guides, and won't fatigue readily from frequent sharp bends. Patented "anti-short" breaker strip and flat-stranded grounding wire make it the safest known cable for the job.

When cable repairs skyrocket costs so fast, it's poor economy to buy less than the best. A sample length of Securityflex* Shuttle Car Cable will convince you that this super-safe, super-tough cable can speed your production and cut down those "bad" breaks that leave your men and machinery idle too long. Call your nearest Anaconda Sales Office or Distributor. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

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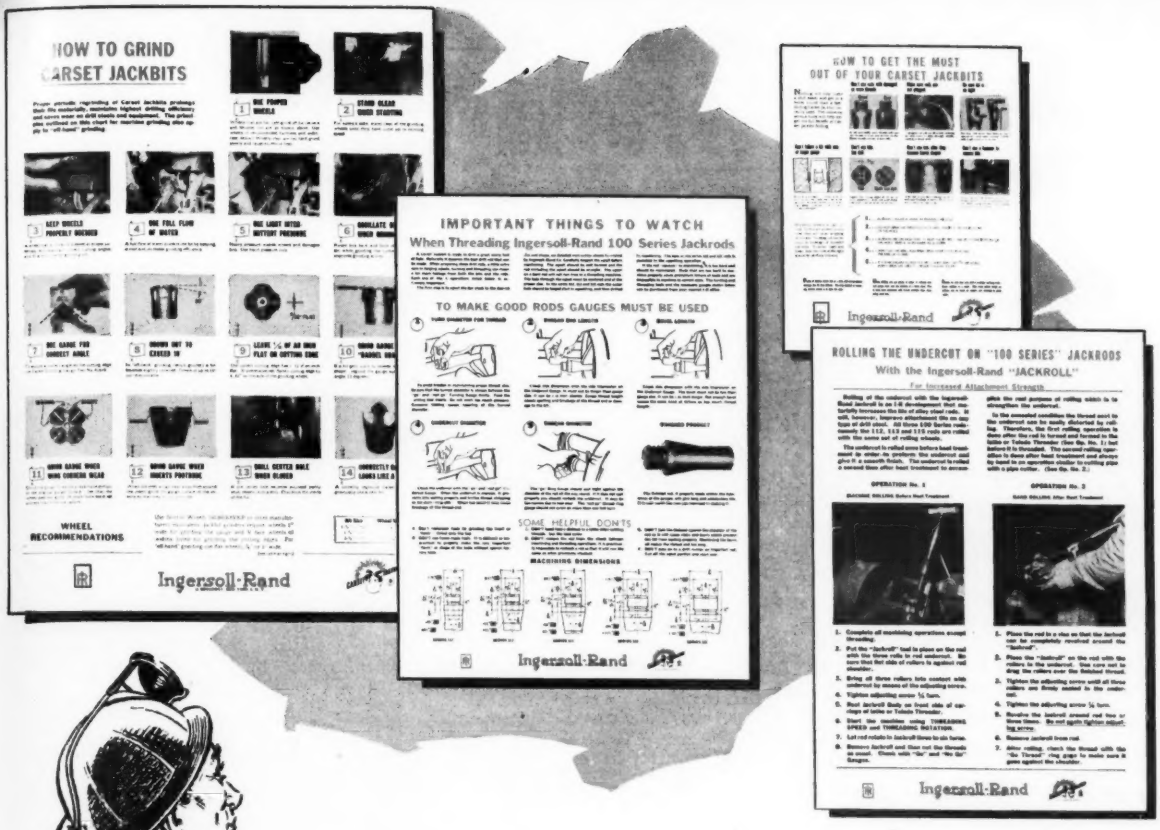
the right cable for the job ANACONDA® **wire and cable**



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** To get maximum drilling speed and longest bit life you should use Ingersoll-Rand Carset Jackbits as indicated on these charts.*

■ Nothing will make a shift easier or help you get in a better round quicker than fast-drilling Carset Jackbits. To help you make sure that your Carset Jackbits are used to best advantage, Ingersoll-Rand has prepared these four large, easily read charts for your bit-shop wall or bulletin board. They give simple illustrated directions for using and servicing Carset Jackbits and threading 100 Series Jackrods.

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Ingersoll-Rand 7B4-15

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Please send me, free of charge, the wall charts checked below:

- ☐ Grinding Carset Jackbits, Form 4121
- ☐ Using Carset Jackbits, Form 4122
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Company_____

Address_____

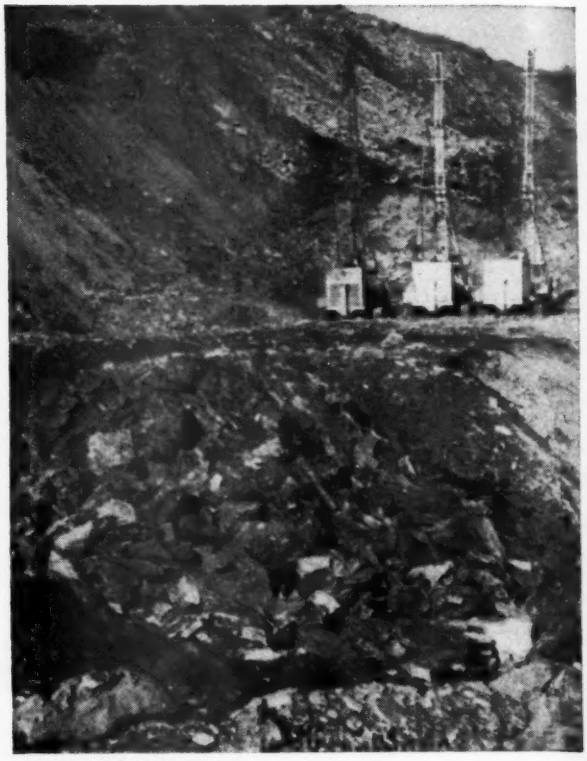
City_____

Excellent Fragmentation

Speeds Removal of Overburden

"NITRAMON" SAFELY LOADED IMMEDIATELY AFTER DRILLING HOLES IN COAL STRIPPING OPERATION

BEFORE A TYPICAL BLAST at the Repplier Stripping of Correale Construction Company near Pottsville, Penna. Here, loading 17,000 lbs. of Du Pont "Nitramon"*—safest blasting agent known—is quickly completed. Shot required eight well drill holes averaging 60' in depth. "Nitramon" is packed in easily handled, watertight containers and may be loaded immediately after holes are drilled . . . a particularly important point in this section of the country.



AFTER THE BLAST . . . excellently fragmented overburden approximates yield of 23,000 cu. yds. and permits easy, quick removal of rock. "Nitramon" *promotes* safety. It cannot be detonated with commercial blasting caps, or by fire, shock or friction. However, a "Nitramon" Primer, itself relatively insensitive, dependably detonates every charge. The non-headache producing characteristic of "Nitramon" is another feature.

DU PONT "NITRAMON" is ideal for coal stripping operations and is widely used in this type of work. The Du Pont representative in your district will gladly give you complete information about this safest blasting agent. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

*Reg. trade-mark for nitrocarbonitrate blasting agent.

DU PONT "NITRAMON"

A Product of Du Pont Explosives Research

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. . . THROUGH CHEMISTRY

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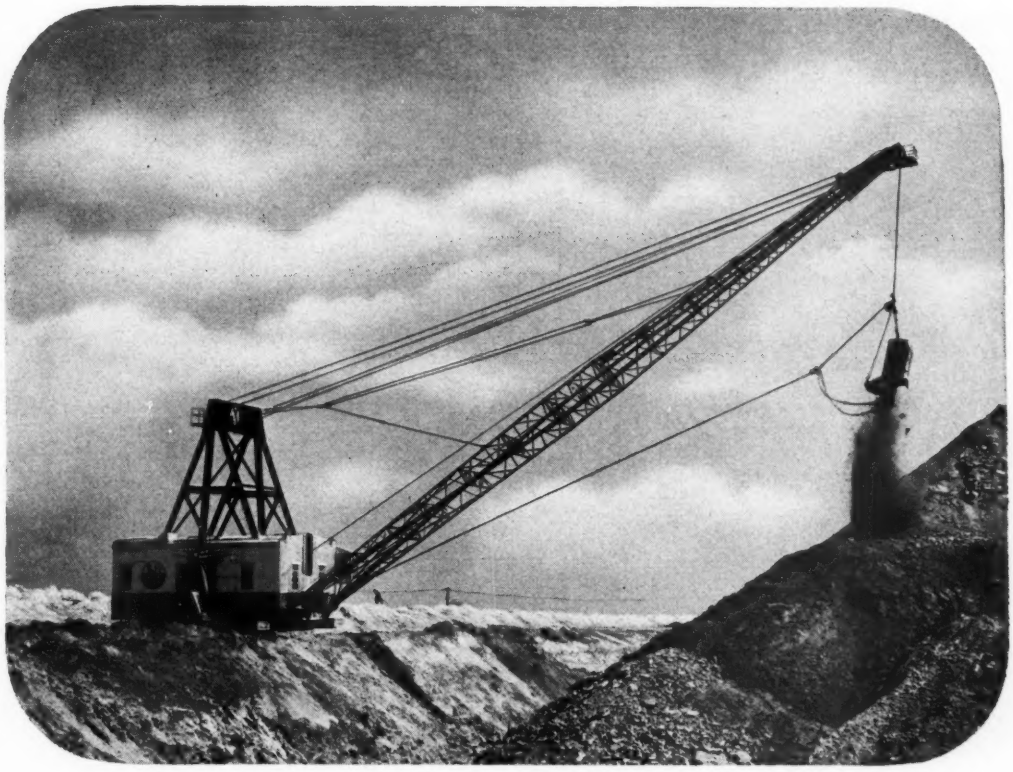

This is the most economical rope we've ever made for mining

ROEBLING is the best known name in wire rope. That's partly because we were the first wire rope maker in America. But more than that, we've always led in developing better wire and better rope for every purpose.

Today's Roebling Preformed "Blue Center" Steel Wire Rope is the miners' best choice for efficiency and long life. This rope has extra resistance to crushing and abrasion... takes rough going. It saves you time and cuts costs.

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from ¾ cu. yd. to 45 cu. yds.

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DIAMOND CORE DRILLS • CONTRACT CORE DRILLING
SHAFT SINKING • GEOLOGICAL INVESTIGATIONS

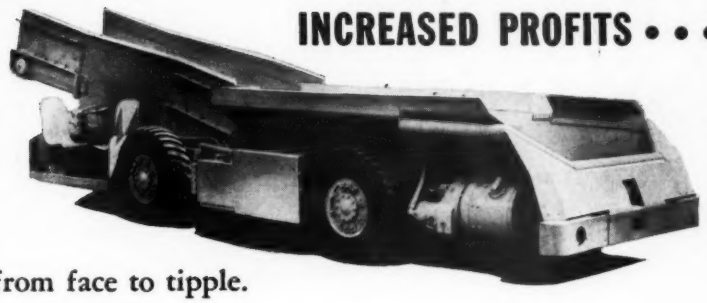
····BELT CONVEYOR AND SH

Photo illustrates a Jeffrey Shuttle Car discharging into end of Jeffrey Belt Conveyor.

This photo shows a Jeffrey Shuttle Car discharging into a Jeffrey Belt Conveyor from the side.

SHUTTLE CAR COMBINATION

TEAM-WORK that pays off in GREATER PRODUCTION LOWER OPERATING COSTS INCREASED PROFITS • • •



● The way in which these Jeffrey Conveyors and Shuttle Cars work together results in one of the most modern methods of transporting coal from face to tipple.

Jeffrey Belt Conveyors for intermediate and main haulage handle large tonnages rapidly and provide low cost maintenance and operation. Extensions are easily and quickly made to keep up with room development.

Jeffrey Shuttle Cars, operating between the loader and conveyor, have come about as close to continuous operation as any system developed to date. Here's team-work at its best. These cars are available in cable reel types with either two or four wheel drive and steering . . . in capacities from 3.75 to 7.75 tons.

Call in a Jeffrey Mining Engineer. He will be glad to help you determine the best arrangement and equipment best suited to your operation.

OUR 75th Year

JEFFREY

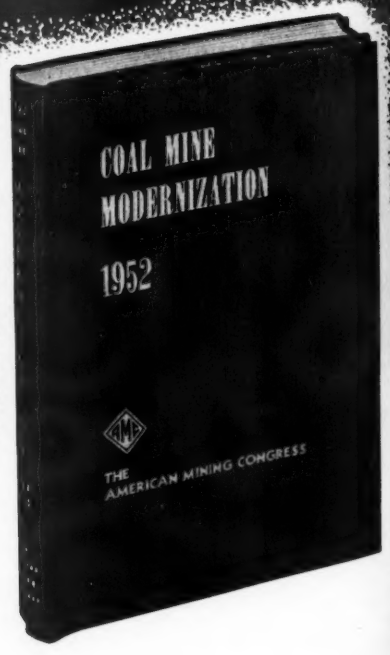
Established 1877

Complete line of Material Handling, Processing and Mining Equipment

Here's the "HOW" and "WHY"—

of Successful...

Coal Mine MODERNIZATION



HERE'S a complete review of progress in every phase of coal mining by the nation's leading executives, engineers and operating officials —all the proceedings of the 1952 Coal Convention.

Coal Mine Modernization gives you hundreds of valuable ideas on methods and equipment that you can put to work right away for low-cost, safe and efficient coal production and preparation.

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WEDGE-NUT STYLE

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More head room . . .
Greater safety . . .

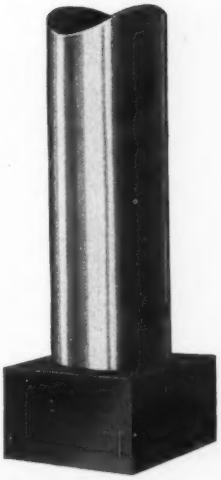
The Hubbard Wedge-Nut Style Mine Roof Bolt is easily installed without the use of special equipment. The full square head, without chamfering, eliminates slipping of wrenches, saves time.

The only head room required for the Hubbard Mine Roof Bolt is the thickness of the bolt head plus the plate. Freedom of movement, for men and equipment, improves working conditions, increases output.

The design of the Hubbard Mine Roof Bolt is simple and fool proof. The wedge-nut consists of two diagonally separated sections. As the bolt is tightened the two sections move one against the other with a wedging action, spreading both parts against the walls of the hole. The wedge so formed takes a biting grip *over its entire length* that holds for keeps.

Hubbard Mine Roof Bolts are ¾-inch diameter. They are furnished in any desired length. Usual installation practice employs plate washers 6-inches or more square (not included). Write for additional details.

Exhaustive tests have proven that Hubbard Mine Roof Bolts meet all requirements for mines where roof bolting is practical.



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ADD NEW LIFE TO WORN EQUIPMENT

Amsco Welding Rods and Electrodes For repair welding of manganese steel shapes to worn equipment, American Manganese Steel Electrodes retain their toughness and give real operating savings.

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Editorials

JOHN C. FOX, *Editor*

SEPTEMBER, 1952

We Mourn Our Loss

THE ten days from August 23 through September 1 were declared a National Memorial Period by the president of the United Mine Workers of America. It is altogether fitting that honor should be done those who have made the great sacrifice. Every year we observe Memorial Day and Armistice Day as tributes to those who have died serving their country on the field of battle. Those who lose their lives in the coal mines of this country also are serving the nation and their sacrifice should likewise be recognized. Thus far we agree with John Llewellyn Lewis.

But why pick this particular time and why stop production for ten days? True the loss of about 10,000,000 tons of coal just now may not be too serious a matter. At the start of the Memorial Period there was an 80-day supply above ground. With four full months before Christmas possibly the miners might recoup the $80 which this layoff will cost each one, in time to provide a Happy Christmas for their families. Even with the pay boosts gained in recent years, it will be 1956 before the miners will have regained what they lost in wages during the strikes and three-day work weeks back in 1949 and '50.

Not long ago Lewis served notice on the signatories to the various Wage Agreements between the UMWA and coal operators that he wished to open negotiations for new agreements. By reducing coal inventories above-ground now, he puts himself in that much better position to demand settlement on his own terms later on.

Tactics adopted by the leadership of a large nationwide industrial union inevitably partake of the nature of political maneuvering. Perhaps, some may think the "end justifies the means," but does this justify making capital of human misery?

Public opinion will supply the answer to such tactics.

At the Equinox

THE President's Materials Policy Commission after careful examination finds that, "Despite progressive increases in imports the Nation still will look to its own reserves for most of its minerals supply."

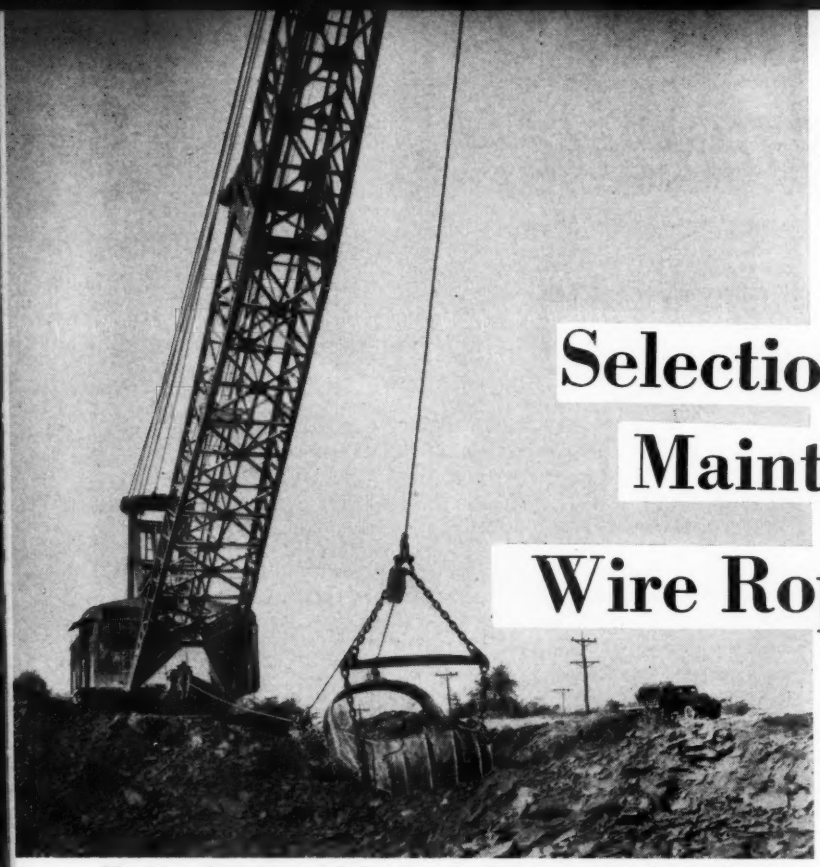
To provide the major share of the 50 to 60 percent increased demand for industrial materials which the Report envisions, it is clear that a strong domestic mining industry will be needed.

Among the proposals contained in the million-word Report are some that are definitely beneficial to American mining and others that appear to contradict the basic premise, expressed at the outset, that private enterprise is "the most efficacious way of performing industrial tasks in the United States."

Recommendations with which the mining industry will be in general accord would: speed up the geologic mapping of the United States and Alaska by the U. S. Geological Survey (only 11 percent of our total area has thus far been mapped); intensify research to improve exploration methods, with government taking a hand only where private industry cannot be expected to take on the assignment; maintain percentage depletion as a means of encouraging private companies to explore for, develop and produce metals and minerals; remove present limitations on amounts chargeable to mineral exploration costs which may be expensed for tax purposes; provide reasonable aid to small mining companies prospecting for strategic minerals; and continue stockpiling of metals and minerals for national security.

On the other side of the ledger are such controversial proposals as to: change the basic mining laws governing the location system; perpetuate present emergency agencies; eliminate protective tariffs and abandon the "Buy American" philosophy; establish agreements similar to the International Wheat Agreement and set up international "buffer stockpiles." As to this last, history is full of the failures of long-range attempts to stabilize prices and production through the use of such cartel-like devices—which, when established on an intergovernmental plane, would have the added hazards of politics and bureaucracy.

Space will not permit a full analysis of the voluminous report submitted by the Commission. What the consensus of the mining industry is will be reflected at the convention of the American Mining Congress in Denver this month.



Like the equipment upon which it is used, wire rope is a complex machine with many moving parts

Selection, Care and Maintenance of Wire Rope in Mining

By A. J. KING
Chief Sales Engineer
American Steel & Wire Division
United States Steel Co.

Make Your Wire Rope Dollars Stretch Farther—Here are Rules That Can Have Great Effect in Reducing Mining Costs

WIRE rope is a vital part of any mining operation. As an important and useful tool, it is deserving of just as much attention as any other equipment. Yet, it is often purchased and installed with little thought given to its selection and then neglected and abused, necessitating frequent and expensive replacements. This lackadaisical attitude in selection, care and maintenance of an important accessory costs the mining industry many thousands of dollars which, with a little thought and care, can be saved.

Manufacture of wire rope is an exacting science. Too often this fact is little appreciated by the average user, and the full measure of efficient and economical service built into it, and maximum economy of operation, is not fully realized. Wire rope is a *complex machine*—a highly specialized tool—composed of many moving parts. These are designed and manufactured with precision and exactness to bear a definite relation to one another. However, like any machine, even the finest wire rope can be destroyed quickly through faulty installation and use, or improper care and maintenance. Therefore, although rugged in character, it is logical to expect that the length of service rendered will depend entirely upon its treatment during installation and throughout its useful life.

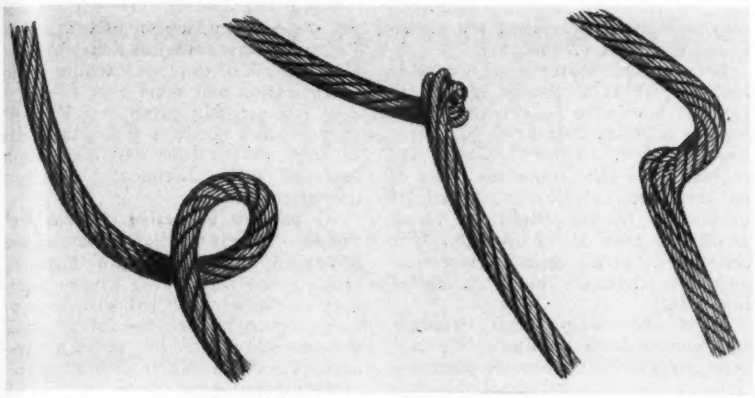
A Correct Rope for Every Job

There is no such thing as an all-purpose rope. There are many constructions and several grades or strengths, in a variety of sizes ranging from 1/16 in. to four in. in diameter. To meet the varied and exacting operating conditions and service requirements, each one must have certain definite characteristics and properties. Standardizing on any one kind, type, or grade for the wide variety of uses in the mining industry, may appear desirable, but is not feasible. "Measuring" the job for the correct rope often requires a functional knowledge of requirements and performance expected. In every case, safe, efficient, and economical use of wire rope starts with selection of the proper size, construction and type and its subsequent care and maintenance.

Prime objective of the operator is to dig or hoist material as economically as possible. To accomplish this there are two things to consider when determining the most economical rope to be used on a particular installation. The first of these, is the initial cost of the rope. The second is the length of service expected. In wire rope as in other products, it is rare indeed that the item with the lowest initial cost will give the greatest service. Actual rope economy, therefore, must be based on a rope cost per unit of material handled or per unit of elapsed time where accurate records of material handled are not available.

Has Several Qualities

Wire rope is a *tensile device*. It differs from other tensile members in that it has the ability to sustain loads under varying conditions of stress and repeated bending. Because of this it must possess strength and



Kinks and loops are the bane of wire rope

fatigue resistance, and since it is a moving part of some unit, it must also possess abrasion resistance. These properties are required in varying degrees. Being so closely related to each other, collectively they represent a complex problem. On any installation or under a specific set of conditions, a wire rope must possess *all* properties but not always in the same proportions, whether the rope is used on large or small hoists, shovels, draglines, cranes, excavators, conveyors, loaders, or unloaders, and underground equipment.

Strength. This is determined by size and grade. Wire rope can be made with most any desired tensile strength ranging from Mild Plow Grade, approximately 190,000 psi, to Improved Plow Steel or Monitor Grade at approximately 250,000 psi with uniform strength throughout.

Fatigue Resistance. The ability to make wire that will stand thousands of bends over drums and sheaves without breaking is no small accomplishment. Quality control throughout the entire manufacturing process from the ore to the finished product ensures wire in the rope with just the right amount of toughness and ductility plus high strength. Wire *must be* especially fabricated for wire rope use. Ropes composed of a large number of small wires will have higher fatigue resistance than those made with a smaller number of large wires.

Abrasion Resistance. This is determined by the size and the chemistry of the wires, especially the outer wires as they are exposed to the most wear. Obviously, the larger the wire size the greater its resistance to abrasion. Furthermore, high strength steels are better able to withstand wear. This means that Monitor or Improved Plow Steel Wire Ropes would have the highest abrasion resistance.

Getting the Right Balance

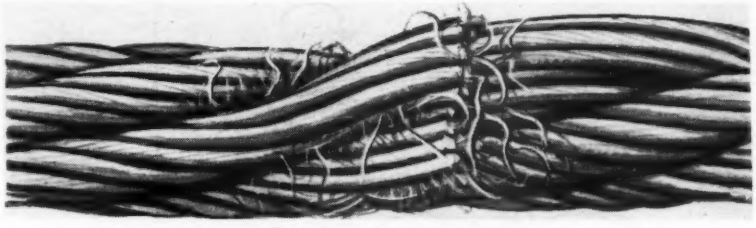
Individually, the properties of strength, fatigue resistance, and abrasion are not difficult to obtain, but in wire rope making, it is impossible to accent one property without detriment to the other two. Satisfactory performance demands that running ropes possess all three properties and, therefore, it is necessary to obtain an effective balance which meets the requirements of the particular application involved.

Get Longer Wire Rope Life

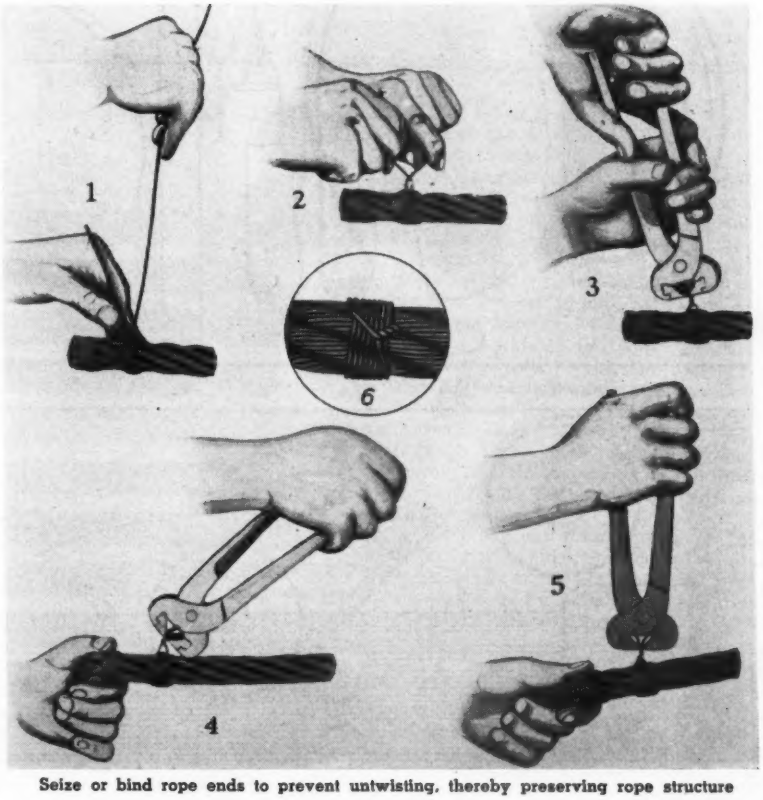
Do not mishandle when unloading or storing. Avoid dropping from cars or trucks as the weight of the rope will collapse the drum on which it is wound causing the rope to cut in with subsequent severe damage when unreeling for installation.

Store in a dry place. If not used immediately, keep fully protected from the weather and away from all corrosive fumes.

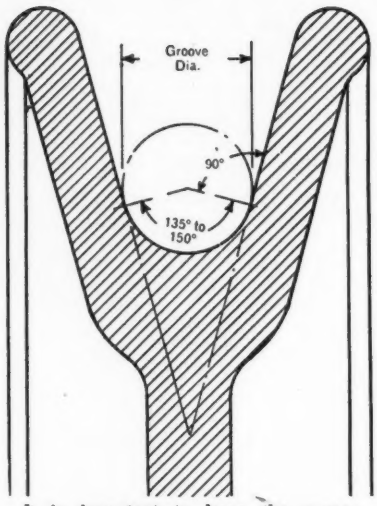
When cutting wire rope from a reel prior to installing, take pains to seize or bind the ends of the rope. This prevents untwisting and preserves the rope structure. If strands



Rusted rope is poor rope



Seize or bind rope ends to prevent untwisting, thereby preserving rope structure



It is important to have the proper sheave for each rope

are permitted to untwist, shortened service results because of the unbalanced condition of the rope.

Breaking-in. After a wire rope is installed, it is advisable always to run the new wire rope with a light load or with no load for a short period of time. This "breaking in" process gives the component parts of the rope an opportunity to adjust themselves to the conditions under which the rope is to operate. The time spent "breaking in" a wire rope will pay dividends in extra useful rope life.

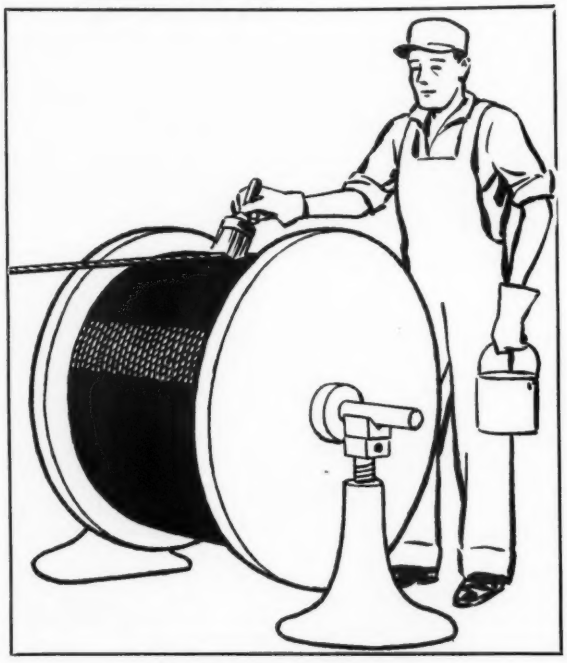
Avoid overwinding, cross winding and uneven drum winding. It is not good practice to have more than one layer of rope on a drum. If this cannot be avoided, the succeeding layers should not crosswind, but should wind regularly in the groove which is formed by the preceding layer. This type of abuse causes more damage to wire rope than most users realize.

Avoid overloading. Do not subject the rope to sudden impact stresses. Sudden stresses or jerks may exceed the strength of the rope causing rapid deterioration and short rope life if it does not actually break it. Even if rupture does not take place, the elastic limit of the rope may have been exceeded with consequent permanent distortion.

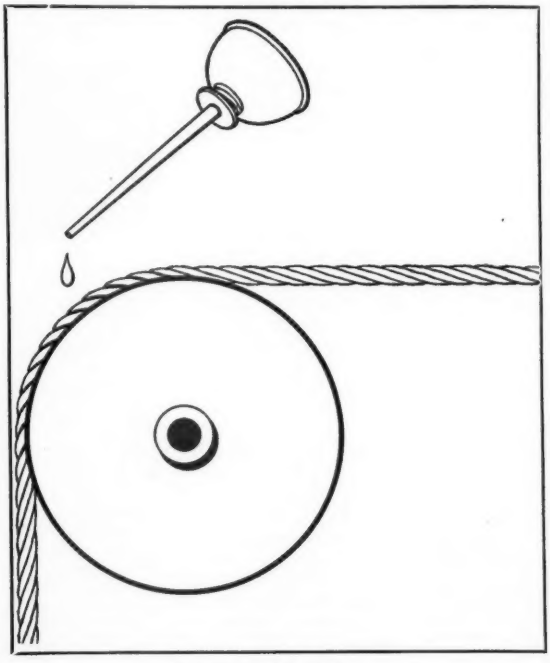
Do not use undersize sheaves and drums. This is the commonest cause of fatigue breaks. Fatigue effects of bending are manifested by the tendency of the wires in the wire rope to break square off and the use of small sheaves and drums will cause a permanent set in a heavily loaded rope.

Make regular cuts from the end of the rope. If possible, reverse the ends. The object of making regular cuts from the drum or fastened end is to change the position of the rope. Wear and fatigue are usually most

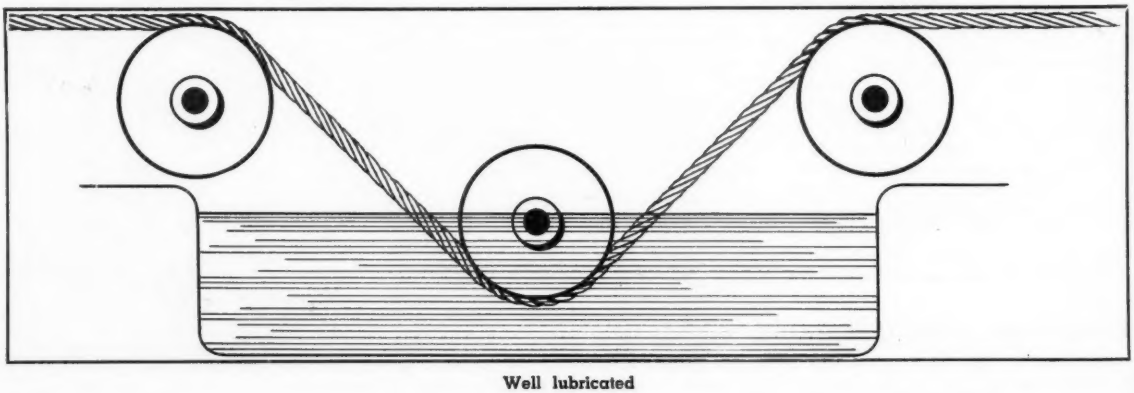
(Continued on page 52)



No matter how you do it . . .



Keep your wire rope . . .



Well lubricated

Truck Shipments of Bituminous Coal and Lignite

By W. H. YOUNG and R. L. ANDERSON
Chief, Bituminous Coal Section Engineer-economist
Bureau of Mines, U. S. Department of the Interior

TRUCK shipments of bituminous coal and lignite from mines amounted to over 100,000,000 tons in 1950. Each year the U. S. Bureau of Mines asks the coal producers to report the method of shipping the coal from the mines. The results of the replies for 1940-1950, inclusive, are summarized in the accompanying table.

A large part of the coal leaving the mine by truck (over half of the total) also moves to final destination by truck. This movement increased from 35,540,000 net tons or 7.7 percent of the grand total production in 1940 to 58,286,000 tons or 11.3 percent of the grand total production in 1950.

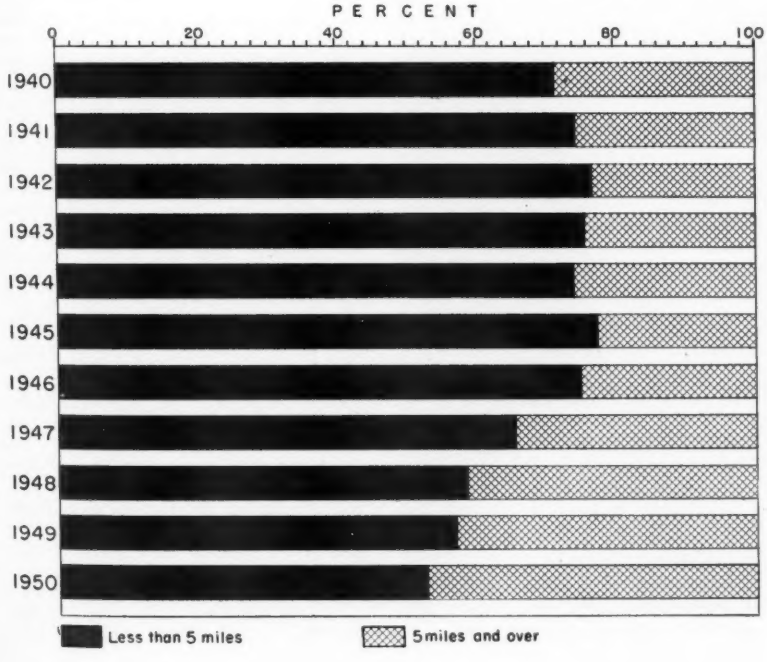
Slightly less than half of the coal leaving the mine by truck moves to a railroad siding or waterway for further shipment to its final destination. This movement has shown an even greater increase in recent years than the movement from mine to final destination by truck. Coal trucked from mine to railroad siding or waterway increased from 6,127,000 net tons or only 1.3 percent of United States total production in 1940 to 42,931,000 tons or 8.3 percent of the grand total production in 1950.

In 1950, 2362 mines shipped coal by truck to railroad siding or waterway. Of this total number, 580 were strip operations and 1782 underground mines. The strip mines accounted for one-third of the total tonnage trucked and the underground mines for two-thirds of the total.

TRUCK SHIPMENTS OF BITUMINOUS COAL AND LIGNITE, IN THE UNITED STATES, 1940-1950, INCLUSIVE.

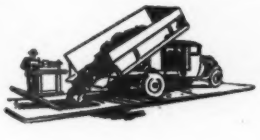
	Trucked from mine to final destination		Trucked from mine to railroad siding or waterway		
Year	Thousands of net tons	Percent of total Production	Thousands of net tons	Percent of total production	Average distance trucked (miles)
1940	35,540	7.7	6,127	1.3	3.6
1941	40,056	7.8	12,486	2.4	3.7
1942	45,154	7.7	18,843	3.2	3.9
1943	42,433	7.2	32,092	5.4	3.8
1944	40,123	6.5	51,871	8.4	3.8
1945	41,477	7.2	48,536	8.4	3.8
1946	42,731	8.0	44,070	8.2	4.0
1947	55,859	8.9	48,778	7.7	4.6
1948	58,260	9.7	60,933	10.2	5.3
1949	47,787	10.9	41,489	9.5	5.4
1950	58,286	11.3	42,931	8.3	5.9

Distance Bituminous Coal is Hauled from Mine to Railroad Siding or Waterway



Coal producers were also asked to report the distance coal was hauled from mine to railroad siding or waterway. Since approximately two-thirds of the tonnage shipped reported the distance trucked, the figures appear to be representative. The average distance trucked to railroad siding or waterway increased from 3.6 miles in 1940 to 5.9 miles in 1950. The accompanying chart shows the percentage of total shipments that moved less than five miles and the percentage that moved five miles and over. The tonnage that moved over five miles increased from 29 percent of the total in 1940 to 47 percent of the total in 1950.

The truck has been playing an increasingly important role in recent years in moving bituminous coal from the mines, and all indications are that the trend will continue.



Caselton plant of Combined Metals Reduction Co. at Pioche, Nev.

Combined Metals' Roof Bolting Experience

Where Applicable, Roof Bolts Have Resulted in Considerable Savings, But They are not the Complete Answer

By E. S. McINTYRE

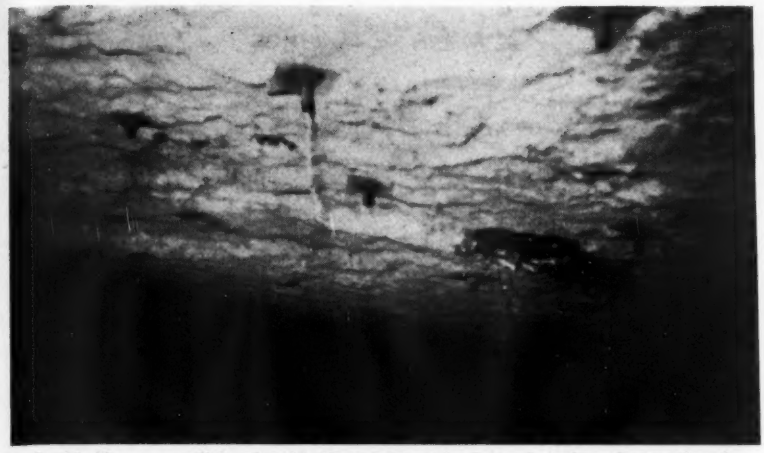
Asst. Superintendent
Combined Metals Reduction Co.

ROOF bolting experiments have been in progress at the Nevada properties of the Combined Metals Reduction Co. for many months in an effort to reduce the mounting cost of roof support and to make room for fully mechanized mining equipment. Results to date show that roof bolting will not replace square set timbering in the badly fractured ground common to many stoping areas, but indicate that roof bolting will accomplish its objectives wherever there is a relatively unfractured, uniform back over our ore bodies.

The Combined Metals orebodies occur as massive replacement of the "Combined Metals" limestone member of the Pioche Shale formation. The 50 ft thick limestone bed lies about 200 ft above the bottom of the 850 ft thick shale formation. The lower 12 ft of the "Combined Metals" bed is relatively massive limestone interbedded with two shale "ribs." The upper 35 ft is composed of thin bedded one to four in. lenticular nodules of carbonaceous limestone with graphite partings. A network of major faults divide the district into a multitude of fault blocks in which the elevation of the favorable limestone horizon may differ by as much as 1000 ft between adjoining blocks. Each fault block contains a crisscross of small faults and fractures with throws of a few inches to 25 or even 50 ft. The complex fault systems and the inevitable adjustments within the fault blocks, including minor thrusting and bedding plane movement, has thoroughly fractured the brittle limestone and has weakened the more plastic shale.

The main ore channel in the Caselton and No. 1 Mines of the Combined Metals Reduction Co. has been followed across 20 major faults for 15,000 ft. The orebody averages 400 ft in width and the ore thickness varies from a few feet along the bottom of the limestone to the full 50 ft thickness of the "bed." Bedding dips range from horizontal to 45° and average 8 to 10°. The usual practice is to mine thin ore (4 to 8 ft) with stull supported stopes and to mine thick ore with modified square set timbering. Broken ore is transported to disposal chutes with slusher scrapers and the stopes are allowed to cave as mining retreats from an edge of the orebody. In the stull stopes the relatively massive limestone and shale ribs in the lower section of the bed provide a uniform back even where fractured, but the thin bedded limestone over the square set stopes is about as cohesive as a gravel bank.

At the Pan American and Prince mines operated by the Combined Metals Reduction Co. the same geologic conditions apply as at the Caselton and No. 1 mines, save that considerably less faulting at these properties has left the limest ne structurally much stronger over wide areas, and this condition applies to large



Roof bolting accomplishes its objective wherever back is relatively unfractured and uniform

areas of lower grade mineralization adjoining the main Caselton orebodies.

Early Work at Caselton

Experimental work with roof bolting was started at Caselton in early 1950 under the supervision of Robert R. Durk, mine superintendent. The actual work was preceded by a study of all available literature on the subject, and in this regard the U. S. Bureau of Mines was most helpful in supplying information. As with any other new method, at the start equipment on hand was used as far as possible. Specialized equipment was added as the program progressed and the need for such equipment developed.

Roof bolts used at Caselton are obtained from the Colorado Fuel and Iron Co. They are one in. in diameter, six ft long, with a 6¼ in. flame-cut slot in one end and 4½ in. of cut threads on the other end. Accessories include a wedge for anchoring the bolt in the hole, an eight-in. square by ⅜ in. thick bearing plate or washer, and a one in. hexagonal nut.

Initially roof bolt holes were drilled with standard rotating stoper drills using one-in. quarter octagon steel and 1-19/32-in. type 2L Liddicoat throw away bits. This gave too large a hole for satisfactory results. Some stoper drills were equipped with new chucks using ⅞-in. hexagonal steel with type 1L Liddicoat bits, gauged to bottom the hole at 1¼ in. This has given satisfactory results wherever ground conditions permit using roof bolts.

Design Adapter

A dollie or adapter has been designed to permit driving the roof bolts and wedges in the hole with a stoper drill. To avoid damaging the threads on the bolts a dollie has been developed to screw on the bolt threads until solidly seated against the end of the bolt. The opposite end fits over a drill steel secured in the chuck of a stoper drill, and the bolt and wedge are driven home with the stoper on "stop rotation."

An impact wrench driven by compressed air and having approximately 400 ft lb of torque is used for tightening the nut on the bolt.

To start the program, a picked crew was closely supervised until trained in procedure. The U. S. Bureau of Mines helped by sending H. C. Loesche, mining engineer, to Pioche with motion pictures showing roof bolting practices. Mr. Loesche was helpful in discussing how various problems had been handled at other operations.

Roof bolting was first tried in a square set stope, advancing the stope with roof bolts and timber as a safety precaution. The back was fractured, thin bedded, nodular limestone, as described previously. It was found difficult to anchor the bolts securely, and the back between the bearing plates would slough until finally the bolts fell out. Various modifications were considered such as the use of bolt supported steel beams with lagging, and the use of heavy wire mesh fencing supported by the bolt bearing plates. It was decided to defer these experiments until roof bolting procedure was more fully developed under more favorable circumstances.

Bolts Prevent Sloughing

Roof bolting was next used to support the back over a large pump station excavation. From past experience it was known that the pump station, while not in heavy ground, would have required full timber support to avoid constant sloughing of the back with eventual failure of the roof. Roof bolts were placed on five-ft centers both ways across the back of the station in holes drilled perpendicular to the bedding plane. Some thin beds which had already started to sag were pulled back into place when the bolts were tightened, and there has been no sign of any sloughing or weakening of the roof. The bolts not only saved direct cost of materials and supplies as compared with conventional timber support, but have the added advantage of leaving adequate room on the station. The bolts are also used to support the rail

Holes bottoming at 1¼ in. diam are drilled with stoper designed with offset leg

for a trolley hoist and for hanging pipe and electrical conduit.

This was followed by the use of roof bolts to replace stulls in stoping areas in thinner ore where the back was still in the more massive section of the limestone bed. Bolts are spaced on five-ft centers and are kept close to the face as drifting or stoping progresses. Results have been most satisfactory in stopes 40 ft wide, and it is anticipated that stoping widths can be increased. Material and labor costs for roof bolt installations are about the same as for stull timbering. Decided advantages in favor of roof bolting are the saving on transporting timber through the mine to the point of use and the cleared stoping areas. In this case the use of roof bolts permitted a change from cross slushing using two small double drum slusher hoists to one large three-drum slusher hoist with a substantial increase in stope output, and a saving in cost per ton of ore mined. Stoping height in this area averages about six ft. To facilitate drilling roof bolt holes in these low stopes, stoper drills were purchased with an offset leg particularly designed for use in low headings.

Drive Experimental Opening

At the Pan American mine large reserves of low grade lead, zinc, manganese ore in the same Combined Metals limestone have been developed. There is relatively little faulting and the ore occurs in a uniform block dipping about 12°. Ore thickness varies from seven ft to 50 ft and has been developed for an average strike length of 500 ft and a dip length of 2000 ft. The orebody appears ideally situated for fully mechanized mining, providing the back can be supported without timber. Work to date has consisted of advancing entries 20 ft wide by eight ft high on the strike and up the dip of the orebody. These entries have been supported with roof bolts on five-ft centers with completely satisfactory results. Prior work in this mine required timber sets or stulls to avoid excessive rock falls or sloughing. There is no data yet on what to expect when stoping starts to throw weight on pillars and entries adjacent to mined out areas. These entries are in the lower, more massive section of the bed and offer the most favorable conditions for roof bolting.

To determine what results could be expected from roof bolting over stopes a raise was driven 40 ft to the top of the ore, and a 25-ft wide heading was advanced from the top of the raise to stimulate the roof exposure anticipated in the next planned stoping operations. The back is thin bedded limestone similar to that previously described for the Caselton mine, but with considerably less fracturing. Roof bolts were placed on five ft centers as the heading progressed. The back was carefully scaled before roof bolting to remove all loose slabs. Within several days the back was observed to sag between bolts, and required constant scaling to maintain a safe heading. Later, rock falls occurred during blasts in the heading, and within a week the bearing plates were suspended by the bolts extending two ft from the roof. The bolts remained solid and there was no sign of immediate failure of the bolt, but the method as applied could not be considered satisfactory for large scale mining.

In some places, bolts on five-ft centers replace stulls in stoping area

Plan to Prevent Slabbing

Plans are now being completed to bolt steel beams to the back with roof bolts, and to support the ground between the beams with 2 by 12-in. wood lagging resting on the flanges of the steel beams. It does not appear that the ground is particularly heavy, but unless supported between roof bolts, the back will gradually slab out and will eventually fail.

Roof bolting has been found to be a very useful new tool when properly applied under favorable conditions. Help received from the Bureau of Mines and from other operators with considerably more roof bolting experience than ourselves is deeply appreciated. It is hoped that the experience outlined above will be of some use to other mine operators with similar problems. The advantages of roof bolts are obvious where they can be adapted for use, but roof bolts are by no means an answer to all timbering problems.

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Exclusive ROLLING-CAM WALKING ACTION

One big reason why Bucyrus-Erie draglines are such smooth, steady workers is that they are smooth, steady *walkers.* They can step out in any direction . . . on loose sands, over swampy ground, along muddy river bottoms and the edges of banks . . . through weather that would stop crawler mounted machines.

There's no jerking . . . no shocks to machinery, either, because the weight of the dragline is cushioned with almost unbelievable ease by Bucyrus-Erie's exclusive rolling-cam walking action.

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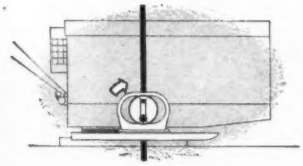
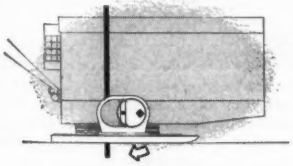
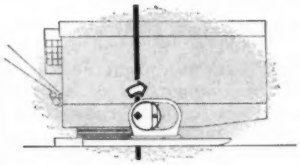
No other walking system is so smooth, so strong or so simple in design



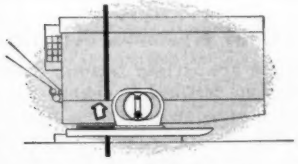
1. Working position. Shoes up — cams in center — guide roller pin at top.



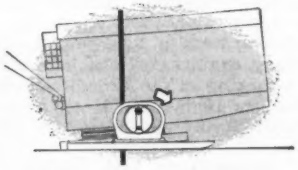
4. Base is lowered as cams continue to roll.



2. Cams rotate — advance shoes and place them on ground.



5. Rotation completed — return to original position.



3. Leading edge of base lifts and skids along as cam rolls to half-way point in rotation.

BUCYRUS ERIE

South Milwaukee
Wisconsin

[*Page 29*]

USBM demonstration plant at Louisiana, Mo., produces 80 bbl of synthetic liquid fuels per day

Back to the Mines for Oil, If Wells Run Dry

BEHIND each grocery store of the lamp-light era stood a bright red barrel, prominently marked "coal oil."

In it was liquid fuel. Soaked up in wicks of lamps now seen only in antique shops, it was ignited to make light for homes. Burning in not-too-efficient stoves, it also provided heat for cooking or to warm rooms.

In those pre-gas and pre-electric days it did a job, and neither the housewife nor the aproned grocer who sold it cared if the fuel was misnamed, since it came from petroleum—not from coal.

Originally—and briefly—that liquid fuel for lamps and stoves did come from coal. A special highly-volatile coal was found in certain coal seams in the eastern part of our country. It was called cannel coal, and upon distillation yielded the oil. With the discovery of petroleum, however, kerosene quickly replaced the true coal oil but as long as kerosene was commonly used in the home there were many people who referred to it as "coal oil."

But the day is coming—no one can tell just how soon—when oil actually made from coal will provide the fuel to power autos, trains, trucks, tractors, ships and a wide variety of stationary engines. A coal oil industry is a-borning in the United States and scientists predict that it will be a full-fledged "husky" in a decade or two.

Insurance for Future

Right now, work being done in making oils and gasoline from coal must be classified under the heading of "insurance." The far-seeing petroleum industry has an all-out program to discover new oil reserves. It is meeting with distinct success.

But oil company officials and officials responsible for the national defense have to ask themselves these questions: "How fast would another all-out war deplete our reserves?" "How much oil from Near Eastern fields would reach the United States during an all-out war?" and "Would depletion of natural petroleum resources return us to the steam-engine era?"

Thinking in these terms, many are saying that a synthetic liquid fuels program must be developed by the United States as insurance. For oil and gasoline are the backbone of modern mechanized warfare and a world on wheels.

There are deterrents to such a program. Plants to make gasoline from coal are costly. One plant to produce approximately 30,000 barrels of gasoline and other products per day is estimated to cost $326,000,000, or almost as much as U. S. Steel's new integrated steel plant at Morrisville, Pa. While U. S. Steel can operate its new plant at a profit, even the most optimistic supporters of a synthetic liquid fuels industry cannot see how synthetic gasoline can be produced now at a price competitive to petroleum gasoline.

Admittedly, there are ample reserves of petroleum to last many years unless a major war emergency arises.

Coal Reserves Ample

There are certain factors, however, that seem destined to change the economical unbalance between production of petroleum and synthetic fuels from coal. One of these is the fact that reserves of coal in the United States—enough for more than 2000 years at the present rate of usage—are far greater than reserves of petroleum which are estimated presently to be sufficient to last 20 to 30 years at the present rate of usage. New reserves of petroleum and coal undoubtedly will be discovered, but from a long-range point of view it must be acknowledged that coal will be plentiful long after petroleum has become scarce.

Light oils recovered in charcoal absorption section of a Fischer-Tropsch synthetic liquid fuels plant are blended in a gasoline to make butane and propane

A far more important factor expected to make production of synthetic liquid fuels from coal economically feasible, however, is the large number of chemicals that may be obtained by varying only slightly the two best-known processes for making gasoline from coal. In fact, scientists and research men, working hard on this phase of liquid fuel production, now believe that the processes can be made to produce more chemicals than gasoline.

A marked interest has been shown by the public in work now being carried on in the synthetic liquid fuels field. Some of this has been sparked by the knowledge that Germany, at the end of World War II, was operating 70 percent of its mobile war equipment with gasoline made from coal. This gasoline was comparatively expensive, but with a war to be fought and available supplies of petroleum low, Germany had no alternative.

Science Will Supply Answer

But the public probably has grown more interested in synthetic liquid fuels because of the vastly important role gasoline plays in most forms of modern transportation. And Americans are the "travelingest" people in the world. Just the faintest hint that petroleum supplies won't last forever sets them to thinking "How'll I run my car without gas?" Correctly, they look to science to furnish the answer.

Well, how is science doing it? Can a lump of coal be squeezed like a lemon until it yields a juice that can be refined into gasoline? It's not a process of getting something out of coal, but rather of taking the basic elements in coal and, through molecular engineering, creating new products.

Coal contains essentially carbon and hydrogen. Petroleum contains the same elements but in a different ratio. It has more of the hydrogen, probably due to the fact that it was formed principally from decaying animal matter while coal was formed from greater amounts of decaying vegetable matter. Hydrogen, when added to coal under proper conditions, causes it to liquify and become something like petroleum in chemical composition.

So the artificial production of a liquid fuel from coal depends merely upon combining the molecules in coal with a greater ratio of hydrogen. That sounds simple, but it's really a difficult chemical process. Duplicating the feats of nature is seldom simple.

How It Is Done

There are two leading processes for making gasoline from coals. One is called hydrogenation. It starts with powdered coal in a slurry (usually of oil) and, under temperatures around 800° F and pressures of about 10,000 psi, additional hydrogen is combined with the coal molecules to form a liquid fuel.

Scientists call the other process gas synthesis. Powdered coal and steam make a gas which is principally a mixture of carbon monoxide and hydrogen. The needed additional hydrogen is obtained from the steam, since water, as any schoolboy learns, is made up of two parts hydrogen and one part oxygen. Since this process requires temperatures around 2400° F, oxygen may be added to generate more heat. The gas is then put under approximately 300 psi pressure with a catalyst to convert it to a liquid.

Chemicals Too

Once a plant of either type is built, the men who do the molecular engineering can make minor changes in the process to bring forth chemicals in addition to gasoline. Currently, these experts are giving more attention to the hydrogenation process in the belief that it will produce a greater variety of chemicals needed in industry today.

Take, for instance, the chemical benzene which has been in short supply since before World War II. It goes into plastics, synthetic rubber, paints, resins, dyestuffs, medicinals, pharmaceuticals, explosives and scores of other products. Dr. E. E. Donath, noted German scientist who now is manager of the Fuels Processing Section, Research Department of Koppers Company, Inc., estimates that a hydrogenation plant designed to produce 30,000 bbl of synthetic liquid fuels daily can be made to produce, among other things, as much as 17 percent of the total amount of benzine produced in the United States in 1950. At the same time the plant could be made to produce 18 percent of the 1950 U. S. production of phenol, 400 percent of the creosols, 135 percent of the xylenols and 50 percent of the tar acids, as well as some other products.

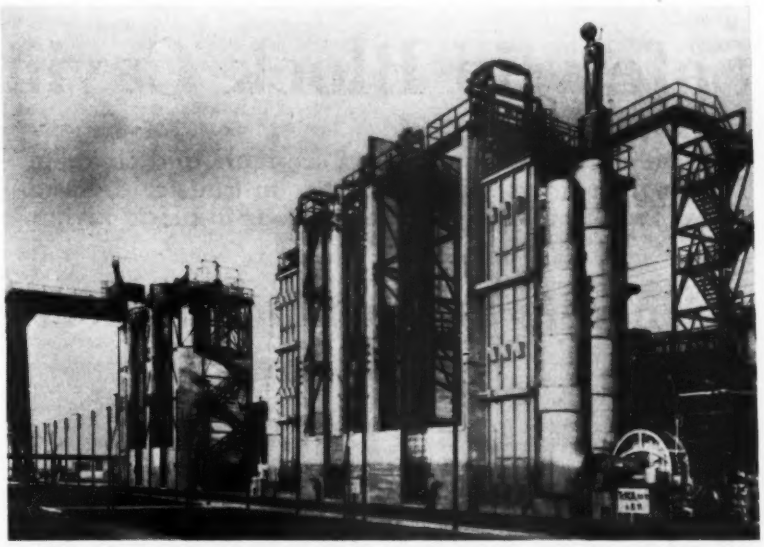
Thus the chemical potential of a large hydrogenation plant may contribute greatly to pushing such plants along the way to economic feasibility.

When such plants come, the effect on the U. S. coal industry will be enormous. Dr. A. R. Powell, associate manager of Koppers Research Department, has done some serious study on this matter. His figures are based primarily on use of the gasification-type plants and their application to production of chemicals.

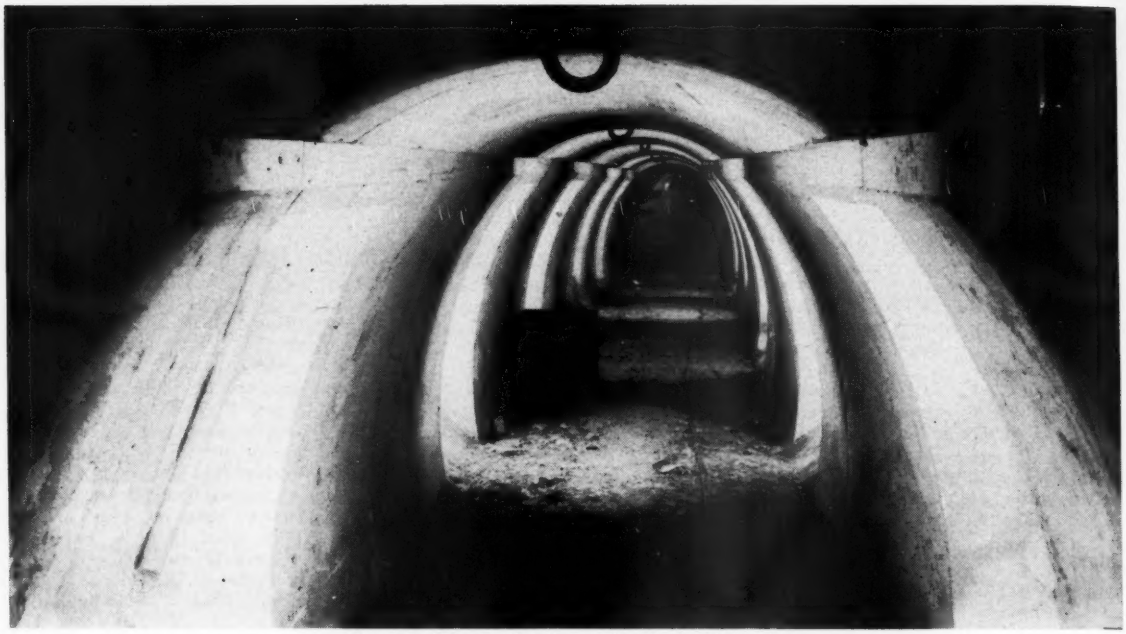
Assuming that by 1975 gasafication plants capable of producing 700,000 bbl of liquid fuel per day are in operation, such plants would use more than 150,000,000 tons of coal annually, which is more than 25 percent of present coal production.

How much do American scientists and engineers know about the building of such plants? Plenty. The U. S. Bureau of Mines has been exceedingly active in development work. So have some private industries which have a huge backlog of knowledge in the chemistry of coal.

Mr. and Mrs. America can't expect to be driving their car into town within the next few years on a fuel that used to be a lump of coal. But most people living today certainly will do so. And when that time comes, the processes for making oil from coal will also be increasing the supplies of the myriad chemicals which make for better living.



Heart of hydrogenation process are high pressure reactors where paste of powdered coal and oil, in the presence of hydrogen and a catalyst, under heat and pressure produces a hydrocarbon material from which liquid fuels and hundreds of chemicals can be separated



Concrete lining makes for a cleaner working drift

Safety in Block Caving

Circular steel sets at one iron ore mine and concrete at another have replaced timber in transfer drifts to improve safety and speed operations in block caving

By H. H. KORPINEN
Superintendent, Mather "A" Mine
and H. C. SWANSON
Superintendent, Mather "B" Mine
Cleveland Cliffs Iron Co.

Concrete for Ground Support

By H. C. SWANSON

GROUND was broken for Mather Mine "B" Shaft, located in the city of Negaunee, Mich., early in 1947. Actual sinking of the shaft began in October of that year, and by August 1949, sinking had been carried to a depth of 3093 ft.

Approximately eight months were required to cut shaft plats or stations and install skip loading pockets on four levels, namely the 6th, 7th, 8th and 10th levels. The 6th level, which is 2170 ft below surface, is connected through to Mather "A" Shaft—a distance of 8800 ft. The first cross-cuts entered ore about one year after completion of shaft sinking and the first ore was hoisted during the Cleveland-Cliffs Iron Co.'s centennial celebration in June 1950.

Exploratory drilling with steeply inclined holes above the 6th level proved that sections of the ore body had extensive height. Cross-cutting through the ore also proved the ore body had considerable width in various sections.

After careful study of the size and shape of the ore body it was decided to mine the ore by block caving. Radial, drill sub-level stoping from timbered drifts is an alternate minning method used in some of the harder ore not wide enough to permit caving.

All of the large drifts from both Mather Shafts must be supported, whether driven in rock or ore. All of the slusher drifts for the early block caving operations were lined with timber. These timbered slusher drifts were relined four and five times, as mining progressed, using the largest stull timber available. This timbering work was extremely hazardous and each time the drifts required relining conditions were worse because of the broken ground around the drift. Often while timber was being replaced around mill or finger raise openings, one of these raises, which was assumed to be blocked off, would break loose and rolling chunks injured the workmen.

Capable Miners Scarce

The most experienced miners were assigned to this repair work. Rapid expansion of underground operations necessitating advancement of employes with only six months to three years of experience to work as miners, left only a small number of the older experienced men who were qualified to do this type of repairing of drift lining.

At Mather "A" Shaft where hazardous conditions resulting from use of timber developed several years earlier, the use of arch and circular steel sets for support of slusher drifts proved successful in maintaining drifts in heights of ore up to 125 ft.

Because of the greater ore height at Mather "B" and the fact that slusher drifts were to be maintained for a longer period of time, concrete appeared to be the most substantial type of support.

Based on paper given at annual conference of Lake Superior Mines Safety Council.

Traveling, collapsible form, 20 ft long, permits concreting 18 ft of drift at each pour

Concreted finger, or mill, raises allow better control of ore flow

Concrete Blown Underground

Concrete is batched and mixed at a location on surface 250 ft from the shaft collar. By means of a Press-weld Pneumatic Concrete Placer and six-in. Victaulic pipe, the concrete is blown from the mixing plant location on surface into a second placer located on the shaft plat. The second placer blows the concrete directly into the Blaw-Knox drift and raise forms. Four and one-half minutes is required to transport a ¾-cu yd batch of concrete a total distance of 4800 ft from surface to the forms underground.

A traveling collapsible type form is used. The drift form is 20 ft long. Each pour completes the concreting of 18 ft of drift and two drawpoints or finger raises located opposite each other.

In the first two experimental drifts to be concreted at Mather "B", it was necessary to support the sides and back of the drift while it was being driven. Support of the ground was accomplished by using arch steel sets which would allow a minimum of six in. of concrete between the face of the form and the inside face of the steel set. After the form was set up in the drift it was possible to remove the supporting arch sets safely by traveling the form under each set as it was removed. The form provided protection for the men doing this work. Removal of the steel sets allowed an average of 18 in. of concrete around the drift.

In other areas it was possible to drive the drifts naked before concreting.

Advantages of Concrete

Concreting of drifts has several advantages over any other type of support. Among these are:

(1) The use of concrete lessens the ever present danger of a mine fire. Although all of the underground drifts are not supported with concrete, the sections that are concreted provide long fire breaks between the timbered sections.

(2) Concreted finger or mill raises allow better control of ore flow. In timbered drifts these openings varied in size and were not easily blocked off when not in use. Rolling chunks from these openings were the cause of some leg and foot injuries.

(3) The brow or back of the drift at mill raises in timbered drifts was continuously a source of trouble from heavy broken ground, tricky to repair and frequently the source of falling ground, causing injuries.

(4) Concrete lining provides a cleaner working drift. Miners and scrapermen frequently piled or stored material and tools behind timber legs instead of using a tool box or other area designated for this purpose.

(5) The concrete lining also provides a smooth surface for the scraper to operate against. In timbered drifts a leg was often hooked by the scraper pulling down the set or loosening up the lagging and covering which again exposed workmen to injury while repairs were made.

(6) Development can be carried on several years ahead without costly maintenance and repair work as the concrete support will not rot as wood does.

(7) Handling and framing of timber exposed workmen to injuries from the time this material arrived at the mine until it was used underground. In surface timber-yards, injuries to hands are frequent. Use of tools such as saws, axes and other framing equipment are the cause of other hand and leg injuries.

(8) Concreting drifts eliminates tramming of timber which required additional, confusing switching of cars and at times caused collisions and haulage accidents.

(9) The lifting of heavy timber caps underground caused hernias and strained backs.

(10) Although the initial cost is greater in using concrete for underground support, when calculating the final cost, and including the many advantages gained through safer working conditions, it appears to be the cheaper and safer method.

Circular Steel Transfer Drifts

By H. H. KORPINEN

CIRCULAR steel sets have been used successfully at the Mather Mine "A" Shaft since early in 1950 for supporting transfer drifts in block caving areas. These sets are fabricated from six-in., 15.5 lb, wide flange beams and, except for a short sill piece on the bottom, are circular with an outside diameter of eight ft. The sets were designed with the help of Ralph Boeck, consulting engineer and professor of structural engineering at Marquette University, and Ralph Siegrist, sales engineer of the Commercial Shearing & Stamping Co. of Youngstown, Ohio. The set is composed of four pieces, three circular, which make up the cap and posts, and one short, straight sill piece. All four pieces have butt plates welded on both ends and are bolted to each other with two one-in. bolts at each joint. The top, or cap piece, and the bottom sill piece have two sets of holes drilled on the top flange. These holes are used to tie in the sets with 4-ft 8-in. lengths of H-beams.

In the transfer drift development, the sets are put in at four-ft centers and the H-beams, placed parallel to

the direction of the drift, tie in three sets. The tie pieces butt against each other at every other set, making a continuous connection throughout the drift. Due to some deformation of the steel sets, from excessive pressure on the H-beams, a 2-in. by 2-in. by ⅜-in. angle iron has been used in some of the more recent development in place of the permanent H-beams. On the top of the drift, the H-beams are advanced after a new cut has been blasted, the cap immediately bolted to the end of the beam and the back covered permanently, before any of the blasted material is removed. Four to six-in. poles, four ft long, are used to cover the back of the drift and are placed parallel to the direction of the drift. The same size poles are also used to cover the sides of the drift after the set has been completed. However, these poles are placed inside the web of the steel and furnish protection as well as keeping the scraper from catching the steel posts. The average advance per shift with a two-man crew in this development is four ft in ore and 3½ ft in rock. In the wood timber drifts, formerly used as support, the timber used was eight ft long and put in at two-ft centers. The floor of the drift was covered with two-in. plank and three-in. plank was used on the top for the scraper to ride. The average advance with wood timber support was 2½ ft per shift in ore and 1½ ft per shift in rock.

In the mill raise development, a short wood cap or a six-in. pipe, filled with concrete, is strapped to the H-beam on the cap of the circular set. In the wood transfer drifts, a full set was placed under the mill raise and four rounds of cribbing were used.

New Undercut Method

A new method of undercutting the block has proven very successful with the circular steel sets. In this method, all of the undercut drilling and coning is done from inside the drift. Two mill raises are first put up, starting from near the main scraping raise. These raises are then coned with longhole drilling from the drift, the holes averaging 25 ft in length and drilled, fan shaped, at an angle of plus 50° on each end to plus 90° in the middle. The top half, or approximately 13 ft of the hole is charged and blasted with regular electric delays, leaving 12 ft of solid ground above the steel. The balance of the undercut is drilled in the same manner with burdens of four ft per round and retreating toward the center of the block. When the mill raises are reached, a six to eight-ft cut is drilled from the drift and this breaks into the broken ground of the undercut. By undercutting in this

(Continued on page 69)

Use of circular steel sets speeded up operations and reduced hazards of block caving

A screen guard protects drillers from broken scraper tail rope

All undercut drilling and caving is done from the drift

Illustrating shield partly expanded, after insertion in hole.

The time to start is now

The sooner you get started on a roof-bolting program, the sooner you'll begin to enjoy the advantages: the greater safety, increased economy, and freedom from space-consuming timbers in addition to faster transportation and less material-handling, as well as wider mine openings, with improved ventilation.

Bethlehem offers two types of roof bolts to mine operators. Each bolt comes in a variety of lengths, and can be used vertically or at an angle. Write for full particulars.

BETHLEHEM SQUARE HEAD ROOF BOLT
(WITH EXPANSION SHIELD)

An assembly, consisting of unchamfered square-head rolled-thread ¾-in. bolt, plug, and expansion shield. Pressed ears on bolt shank support shield during anchoring. Plug is forced into shield when bolt is tightened, expanding the shield to provide holding-tension. Projections on leaves of shield contact sides of hole, prevent shield from turning when bolt is rotated.

BETHLEHEM SLOTTED ROOF BOLT

Forged slot accommodates wedge. Slot is centered by exclusive process which forms the equivalent of two half-rounds. No steel is lost through burning. Opposite end of bolt has 5 in. of 1-in. rolled threads. When driven against back of hole, wedge is forced deep into slot, expanding bolt-ends. Truncated-cone point prevents damage to threads. Complete with American Standard Regular Square Nut.

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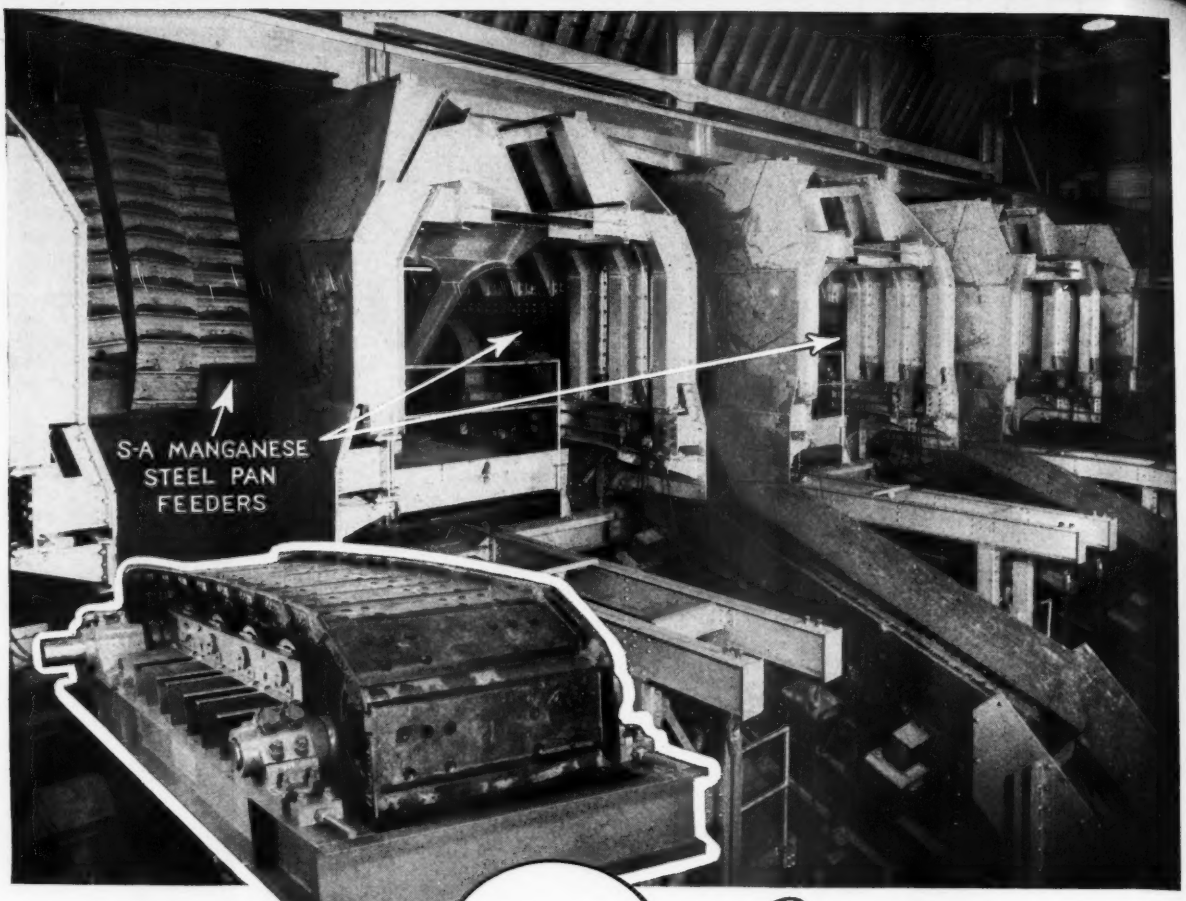
BETHLEHEM STEEL

BETHLEHEM MINE ROOF BOLTS



Thirty feet below track hoppers, four S-A "AMSCO" Pan Feeders receive ore and rock from side dump rail cars. Each Feeder is 6 feet wide by 27 feet long. Together they have a capacity of 3000 tons per hour. Still another feeder (not shown) collects ore from the scalping screens.

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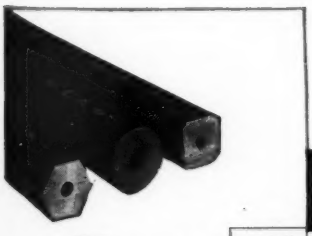
Records of drilling operations prove Crucible Hollow Drill Rod's ability to take it. Service life is high; breakage and bit loss are at a minimum.

For long life and low maintenance, use Crucible Hollow Drill Rods.



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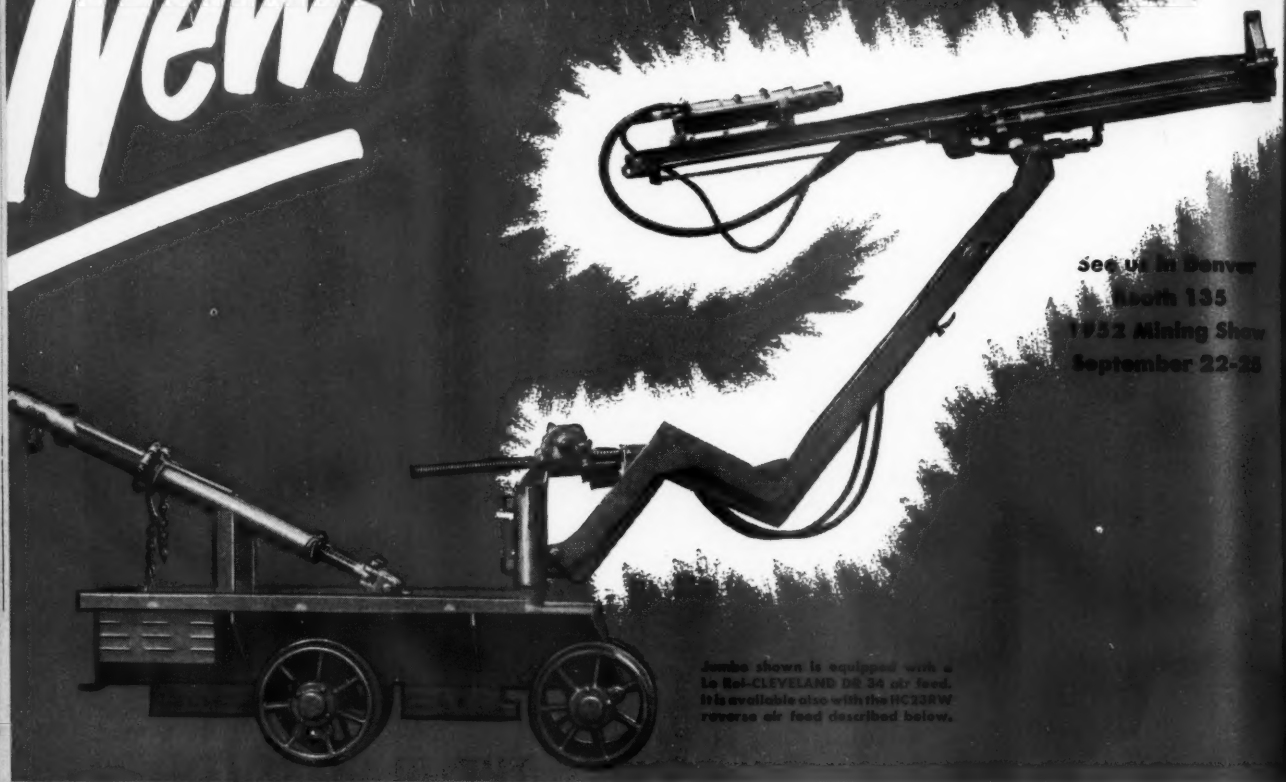

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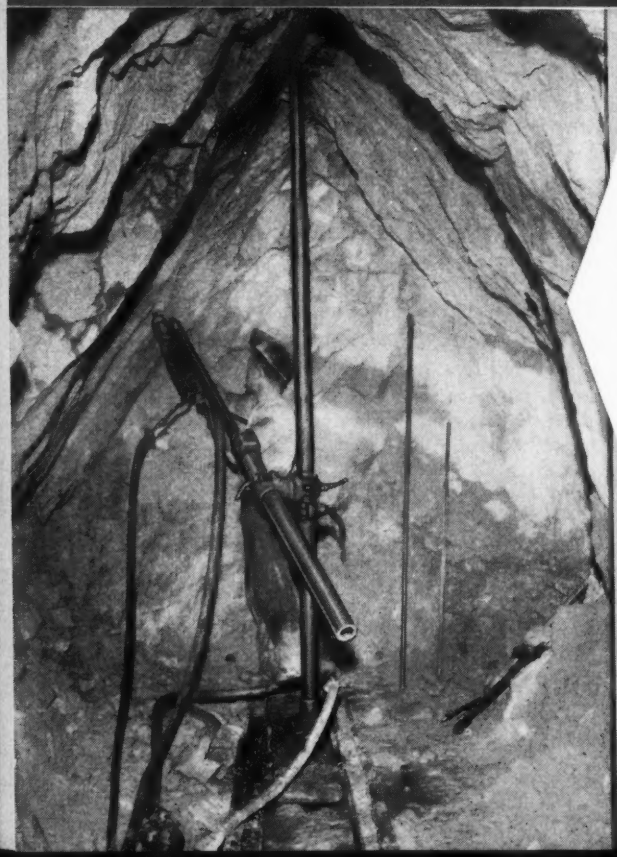
Booth 135
1952 Mining Show
September 22-25

Jumbo shown is equipped with a Le Roi-CLEVELAND DB 34 air feed. It is available also with the HC23RW reverse air feed described below.



Miners like Le Roi-CLEVELAND HC23RW Reverse Air Feed Drifters

Management does, too

Faster Steel Changes! No swing or dump nuts to loosen and reset. Your miners simply swing drifter on feed cylinder and change steels. It's not only easy — it lets them drill out the round faster.

No Stuck Steels! Positive air feed keeps drills working at peak efficiency, avoids stuck steels.

Higher Drilling Speeds! Positive air feed plus proper force of blow and strong rotation give faster drilling speeds with both steel and tungsten carbide bits. You get longer bit life, too, and drill more footage.

Low Upkeep Cost! No feed screws or feed-screw nuts to wear. No complicated power-feed mechanism to give trouble.

Easy to Operate! Built to lighten the load on your miners. Feed controls conveniently located. Reverse air feed withdraws steel from hole quickly.

Faster Set-ups! The combination of Le Roi-CLEVELAND Air Feed Drifters and air columns gives you a unit that can be set up easily and quickly. And you can get the air column in any height you want.

drilling cycles

Le Roi-CLEVELAND *self-leveling* Mine Jumbo with four-foot steel-change Air Feed Drifter

Saves time drilling lifters! Lets your miners drill the right round for any ground!

You couldn't ask for more from a mine jumbo than the performance you get from this new Le Roi-CLEVELAND. It's got plenty of stuff. And the payoff for you is faster cycles, greater tonnage per man-shift, lower costs! Here's why:

Self-leveling, air-motor-powered arm, lets miners spot and space holes quickly and easily, for the most efficient fragmentation. They don't have to loosen a bolt or tilt a boom, to complete the drilling cycle.

Exclusive rigid screw and gearing mechanism keeps the heading straight, cuts down overbreak and underbreak. Keeps the drifters in line, prevents the steel from binding, reduces chuck wear.

Offset arm provides plenty of clearance to drill lifters — without having to take time out to swing the drill under the arm.

You can get this Le Roi-CLEVELAND Self-Leveling Mine Jumbo in either single-arm or double-arm construction. Write for further information and see for yourself how either model can help you get more done every shift.

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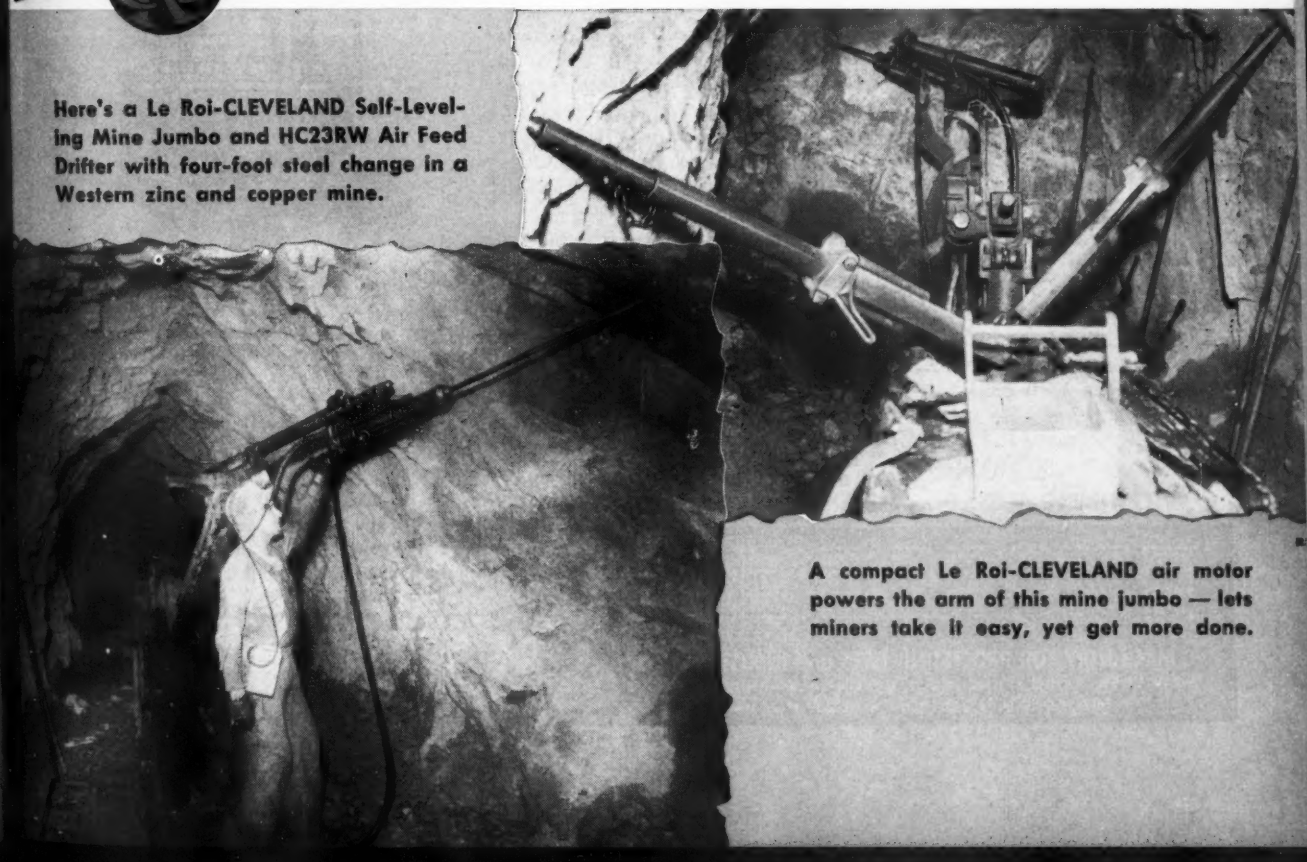


Here's a Le Roi-CLEVELAND Self-Leveling Mine Jumbo and HC23RW Air Feed Drifter with four-foot steel change in a Western zinc and copper mine.

A compact Le Roi-CLEVELAND air motor powers the arm of this mine jumbo — lets miners take it easy, yet get more done.

"Bedeviled Copper" helps to build a battleship

• The hard, ductile, malleable metal known as NICKEL derives its name from "kupfer-nickel", meaning *bedeviled copper,* a name given it by superstitious medieval Saxon miners. These miners, in uncovering what appeared to be a fresh lode of silver ore, thought the devil of the earth, *"Old Nick",* had cast a spell over their ore since it could not be hammered into useful articles . . . *and it was several hundreds of years later that Cronstedt's discovery led to the actual recognition of nickel.*

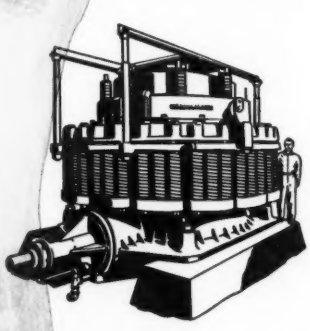
Among the thousands of ways in which nickel now serves man is in the construction of a modern battleship—where this versatile corrosion-resistant metal is used in armor plate, gun tubes, and scores of other ordnance, navigational and communications material.

From the opening of the first Sudbury mine in 1886, the history of nickel is largely that of *International Nickel Company,* who today produce fully 75% of the world's total nickel output. Playing an important role in International Nickel Company's production are twenty *"SYMONS"* Cone Crushers . . . which are recognized throughout the world for their ability to efficiently produce a great quantity of finely crushed product at low cost.

Thus, through the 20 "SYMONS" *Cone Crushers at "Inco" mines passes the majority of nickel used today . . . one more example of a job well done by* "SYMONS" *Cones.*

C652

NORDBERG MFG. CO., Milwaukee, Wisconsin



• **"SYMONS" Cone Crushers . . . *the machines that revolutionized crushing practice* . . . are built in Standard, Short Head, and Intermediate types, with crushing heads from 22 inches to 7 feet in diameter —in capacities from 6 to 900 tons per hour.**

"SYMONS" . . . A NORDBERG TRADEMARK KNOWN THROUGHOUT THE WORLD

"SYMONS" Primary Crushers

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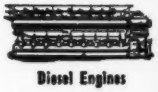

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Conversion Substation Location And Equipment—Part I*

A report of the Underground Power Committee covering ac to dc conversion with suggested methods for determining location of substations and calculating the sizes of the transmission lines

By JOHN A. DUNN
Subcommittee Chairman

THIS report is intended to aid the coal operator in determining the most economical location for a mining-type conversion substation and to aid in the proper selection of ac to dc conversion equipment. It is not the thought of the committee that this report is to be taken as the "last word" in technical advice; neither should it be misunderstood as a recommendation for the use of one type of equipment over another. Its purpose is simply to set forth certain basic factors. Feeder systems in the report are to be considered entirely from a transmission standpoint and a simple method will be shown for the design of dc feeder systems and for setting up design loadings. It is obvious that definite power requirements for mining equipment machinery cannot be stated but a much used rule of thumb will be utilized in sample calculations.

Fundamentally, the conversion substation should be located as near the power load center as possible. In making such a location it is essential to have a correct knowledge of the equipment to be served and, for future economy and power efficiency, it is also essential to have a knowledge of the mine projection and future electric loads. Power must be delivered from the conversion substation over the dc feeder system to the mining equipment with a reasonable voltage drop. At the mining machine, the voltage should not drop below a value which would give reliable operation of the electric motor. This condition is economically advisable for two very good reasons: First, if voltage at the machine drops below a reliable operating value, equipment maintenance costs start climbing. Second, with excessive voltage drop, machines slow down lowering production. When equipment slows down so does the personnel and coal output is further reduced.

In the case of a feeder system nominally rated at 275 v, the regulation should preferably not exceed twenty (20) percent up to the trailing cable. Specifically, the conversion station would operate with 275 v at the bus and the feeder system would be designed for a 50 v drop to the trailing cable. Voltage drop in the trailing cables is to be considered separately from feeder system regulation.

It is good practice to consider each coal producing group of mining machinery as a complete unit, including all equipment used in the producing panel, or a section of a mine, to load and deliver the coal to the haulage which transports to the outside. This group of machinery will be referred to hereafter as a section or section load. In setting up a feeder design, it will therefore be necessary to set up a load value for a section and combinations of sections. These values

* Equipment for ac to dc conversion will be covered in the second part of this report which will appear in the October issue of MINING CONGRESS JOURNAL.

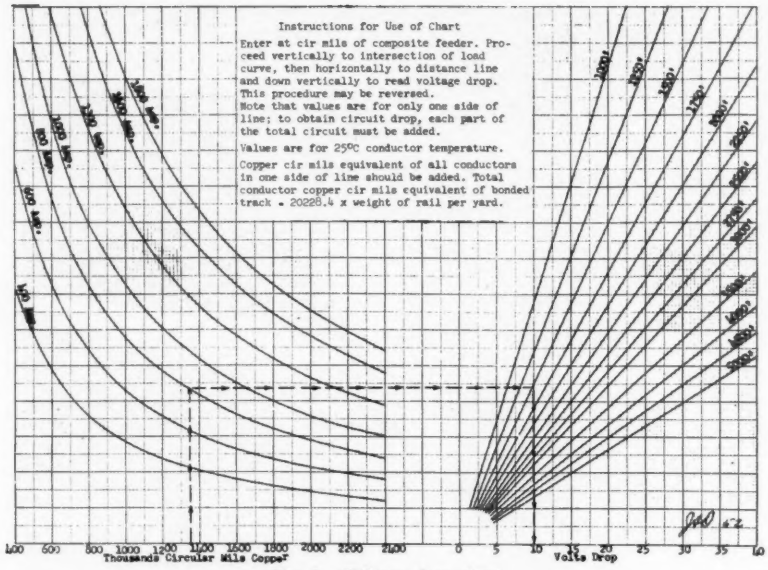


Fig. 1. Voltage drop chart

may be measured or they may be estimated with some degree of accuracy. In giving a rule of thumb for estimating section loads it must be understood that the method is subject to error and that mining conditions may alter them to some extent.

Design Loading

In determining feeder requirements, and therefore substation locations, it is necessary to set up what will be termed "design loading." Some data for development of "design loading" values are obtained by analysis and determination of two factors which define local conditions. Values given these factors may be controversial but the following are offered as suggested procedure.

(a) Determination of Section Load (Demand Factor)

6 ft seam: 80% of total connected hp
5 ft seam: 75% of total connected hp
4½ ft seam: 70% of total connected hp
4 ft seam: 65% of total connected hp
3½ ft seam: 55% of total connected hp
3 ft seam: 45% of total connected hp

(b) To obtain combinations of two or more section loads, add the values obtained from (a), and multiply by the appropriate reciprocal of diversity factors as follows:

Two section load by..... 85%
Three section load by..... 75%
Four section load by..... 67%
Five section load by..... 60%

(c) For 250 v dc operation multiply hp by four to obtain amps.

(d) When estimating feeder loading by the above method, care should be taken to add any continuous load, such as pumping or ventilating, without a diversity factor.

For the purpose of discussion, the following values will be used for section loads; these are in actual use at a mine operating in five-ft seam with mechanical loading equipment.

One section..... 600 amps
Two sections..... 1000 amps
Three sections..... 1300 amps
Four sections..... 1600 amps
Five sections..... 1800 amps

Design loading should be actual dc amps at continually recurring peaks. It is characteristic of dc mine load that there are numbers of sharp peaks of current and the continuously recurring peaks must be carried at design voltage drop, or better, to be sure that the machinery will not stall, thereby overloading and consequently interrupting the circuit. It does not seem economical to design for maximum peaks, therefore some judgment must be used in determining the design value. It does seem practical to design for peaks that occur in the range of 10 to 20 times a shift. In setting up these design values, it would be more accurate to measure similar loads with a recording ammeter.

The dc Voltage Drop Chart, Fig. 1, can be used for feeder design or these values may be calculated by the formula given later. The chart may be entered either at conductor size or voltage drop and the other value obtained. When checking voltage drop for a dc feeder system, care should be taken to see that the circuit is separated into parts having equivalent circular mil conductors. Voltage drops for each part of the circuit are added to obtain the total drop. By inspection, it can be clearly seen that high amperage dc cannot be transmitted any very great distance without the use of very large cables.

When the conductors are paralleled to make up one side of the dc feeder, the equivalent copper circular mils of the conductors should be added to obtain the composite conductor value. Aluminum feeder wire sizes may be changed to equivalent copper CM by dividing CM area of aluminum by 1.6. Conductors of any material may be converted to an equivalent copper value, by substituting in formulae (5) the correct resistance for the material being considered.

Locomotive Haulage Power

Another big factor entering into substation capacity and feeder design is the size of haulage locomotives and the amount of work they do. Most haulage motors are capable of drawing very high currents depending largely on the method used. Power requirements for haulage must be added to substation capacity where these stations are furnishing power for haulage. Here it seems practical to use a good diversity factor applied

As voltage at the machine drops, maintenance costs rise

FORMULAS FOR CALCULATING DC TRANSMISSION LINES UNDERGROUND

The following formulas are simple methods for calculating feeder requirements and voltage drop and are illustrated in Sample Problem No. 1:

(1) $CM=\frac{10800\times D\times I}{V}$

(2) $I=\frac{V\times CM}{D\times 10800}$

(3) $V=\frac{D\times 10800\times I}{CM}$

(4) $D=\frac{V\times CM}{10800\times I}$

(5) $CM=\frac{10800\times D}{R}$

(6) $R=\frac{10800\times D}{CM}$

CM=circular mils
D=length of conductor in $\frac{\text{Feet}}{1000}$
I=current in dc amps
V=voltage drop
R=resistance in ohms
10800 is the resistance in Ohms at 25° C of 1000 ft of copper wire, one CM in area

Mine track having both rails bonded and crossbonded may be changed to equivalent copper circular mils by following method:

$$\text{Track resistance}=\frac{\text{Distance in feet}}{\text{Rail weight per yard}\times 1873} \quad \text{or} \quad \frac{D}{W\times 1.873}$$

$$\text{Track CM}=\frac{10800\times D}{R}=\frac{10800\times D}{\frac{D}{W\times 1.873}}=20{,}228.4W$$

CM equivalent 60-lb track=20,228.4×60=1,213,704: use 1,213,000 CM

In a dc feeder system having more than one substation, voltage calculations become more complex because of multiple feeds. When a load group is between two substations, (A) and (B) as illustrated in Sample Problem No. 2, the calculations are made by following formula:

(7) $I_A=I_L\frac{R_B}{R_A+R_B}$

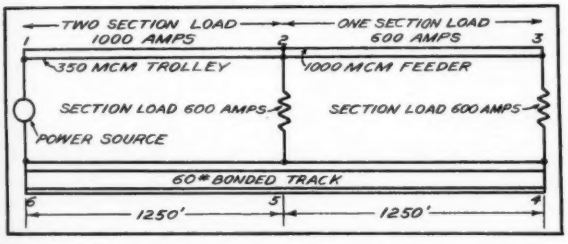
I_A=current in feeders between station A and load.
R_A=feeder circuit resistance between station A and load.
R_B=feeder circuit resistance between load and station B.
I_L=the load current.

If circuit conductors between stations A and B are of the same equivalent cross-sections, further simplification results by substituting conductor length for resistance. Then where D_A and D_B are conductor lengths or distances:

(8) $I_A=I_L\frac{D_B}{D_A+D_B}$

Sample Problem No. 1

Calculation of Voltage Drop where Two Load Sections are Served by One Conversion Substation



The following will illustrate how voltage drops are calculated by the foregoing formulas and also estimated from the curves in Fig. 1. The diagram for Sample Problem No. 1 shows transmission lines and rail return from a substation to two working sections, each with a 600-amp load. Taking the trolley wire plus feeder as 1350 MCM and the copper equivalent of 60-lb track at 1213 MCM, the two methods for determining the voltage drop in the several circuits are as follows:

From Chart—Fig. 1

Feeder Circuit 1-2, 1350 MCM@1000 amp for 1250 ft=10 v
Feeder Circuit 2-3, 1350 MCM@ 600 amp for 1250 ft= 6 v
Track return 4-5, 1213 MCM@ 600 amp for 1250 ft= 6.5 v
Track return 5-6, 1213 MCM@1000 amp for 1250 ft=11 v

Total voltage drop ..... 33.5 v

By Formula (3)

Feeder Circuit 1-2, $\frac{1.25\times 10{,}800\times 1000}{1{,}350{,}000}=10.0$ v

Feeder Circuit 2-3, $\frac{1.25\times 10{,}800\times 600}{1{,}350{,}000}=6.0$ v

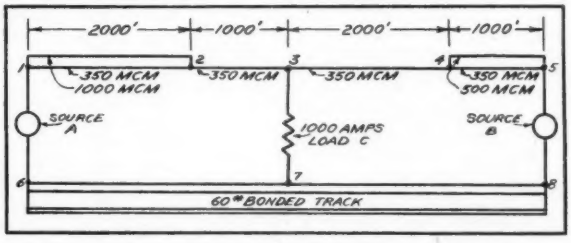
Track return 4-5, $\frac{1.25\times 10{,}800\times 600}{1{,}213{,}000}=6.67$ v

Track return 5-6, $\frac{1.25\times 10{,}800\times 1000}{1{,}213{,}000}=11.13$ v

Total voltage drop ..... 33.8 v

Sample Problem No. 2

Calculation of Voltage Drop with Load between Two Conversion Substations



RESISTANCES IN CIRCUITS FROM STATIONS A AND B

By Formula (6)

Resistance to Load "C" from Source "A"

Feeder Circuit 1-2, $\frac{10{,}800\times 2}{1{,}350{,}000}=0.016$ ohm

Feeder Circuit 2-3, $\frac{10{,}800\times 1}{350{,}000}=0.0309$ ohm

Track return 6-7, $\frac{10{,}800\times 3}{1{,}213{,}000}=0.0267$ ohm

Total Circuit R=0.0736 ohm

Resistance to Load "C" from Source "B"

Feeder Circuit 3-4, $\frac{10{,}800\times 2}{350{,}000}=0.0617$ ohm

Feeder Circuit 4-5, $\frac{10{,}800\times 1}{850{,}000}=0.0127$ ohm

Track return 7-8, $\frac{10{,}800\times 3}{1{,}213{,}000}=0.0267$ ohm

Total Circuit R=0.1011 ohm

CURRENT AND VOLTAGE DROP FROM SOURCES A AND B TO SECTION LOAD C

By Formula (7)

Current A to C=$1000\times\frac{0.1011}{0.0736+0.1011}=\frac{101.1}{0.1747}=578.7$ amp

Current B to C=1000—578.7=421.3 amp.

Volts Drop to C=578.7×.0736=42.59 from Source A or
421.3×.1011=42.59 from Source B.

Feet from Substation	COST IN DOLLARS 600 Amps 1-Sect	1000 Amps 2-Sect	1300 Amps 3-Sect	1600 Amps 4-Sect	1800 Amps 5-Sect
2500	$	$	$ 1,160	$ 3,085	$ 4,395
3000	....	590	3,390	6,165	8,070
3500	....	2,495	6,315	10,130	13,250
4000	....	4,940	9,890	14,830	18,230
4500	....	7,910	14,175	20,420	24,740
5000	972	11,380	19,130	26,820	32,100
5500	2,840	15,380	24,740	34,160	40,400
6000	4,920	19,800	30,980	42,200	49,700

to the haulage motor current if the grades are no more than one per cent and the haulage current is no more than 50 percent of the mining load. This diversity factor could be 50 percent for one section loads and even less for multi-section loads or where the haulage units affect the loading for very short intervals. Where the grades are greater than one percent it would be safer to add in the current taken by the haulage motor.

The most accurate method of obtaining the current drawn by a haulage locomotive is by using train formulae and motor curves furnished by the manufacturer. Another method would be to convert the work done by the locomotive into power and from this obtain the current. The later method is accurate enough for feeder design if the speed and efficiency factors are carefully selected. For this method the following formula may be used.

$$KW=\frac{WR\times FPM}{44254\times E}$$ where

W=Weight of train in tons (cars plus load plus locomotive)
R=Train resistance lb per ton; use 20 lb for friction, 20 lb for acceleration and 20 lbs for each percent grade
WR=Total train resistance in lb
FPM=Speed of train in feet per minute
KW=Kilowatts
E=Efficiency of locomotive—60% to 85% depending on loading of motor, greater load improves efficiency. Normally a haulage locomotive is good for a WR of 500 lb per ton.

Sample problem: Assume a 10 ton locomotive with an efficiency of 85% at 250 v, dc hauling 42.5 ton train load up 2% grade at speed of 6.5 mph.

W=10+42.5=52.5
R=20+20+40=80
WR=52.5×80=4200

$$FPM=\frac{6.5\times 5280}{60}=572$$

$$KW=\frac{4200\times 572}{44254\times .85}=63.9$$

$$Amps=\frac{63.9\times 1000}{250}=256$$

In a track haulage mine the most economical feeder results when the conductance of the hot line equals the conductance of the track. Any requirements above this value necessitates the addition of conductors in both sides of the line. Proper bonding of track is by far the least expensive method of obtaining conductor in the grounded line since this cost normally runs about 15 percent to 20 percent of copper feeder costs. Both sides of line should always be as near as practical to the same conductance. One of the ideal combinations of feeder conductors would be 60-lb bonded track and 350-MCM trolley with 1000-MCM feeder cable as illustrated in Sample Problem No. 1. This would give 1213 MCM copper equivalent in track and 1350 MCM copper in hot line. For the purpose of future discussion this combination will be used as standard feeder.

Conductor Costs

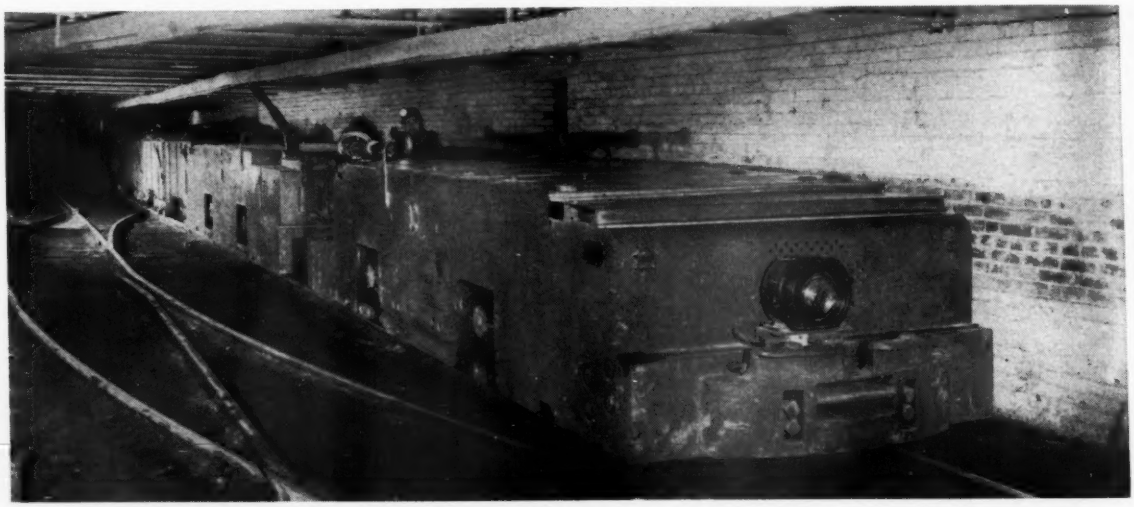
Using 37 cents per lb as base price of copper, present day (June, 1952) cost of 1000-MCM cable installed as hot line runs from $1220.00 to $1340.00 per 1000 ft, depending on fixtures used. The same cable installed in grounded line costs about $1180.00.

For the purpose of estimating, use $1200.00 per 1000 ft for both. Since the cost of the copper is nearly all the installed cost and the cost comparable to the circular mil size of cable, one CM of cable 1000 ft long will cost $0.0012. This value will be used as the cost of conductors.

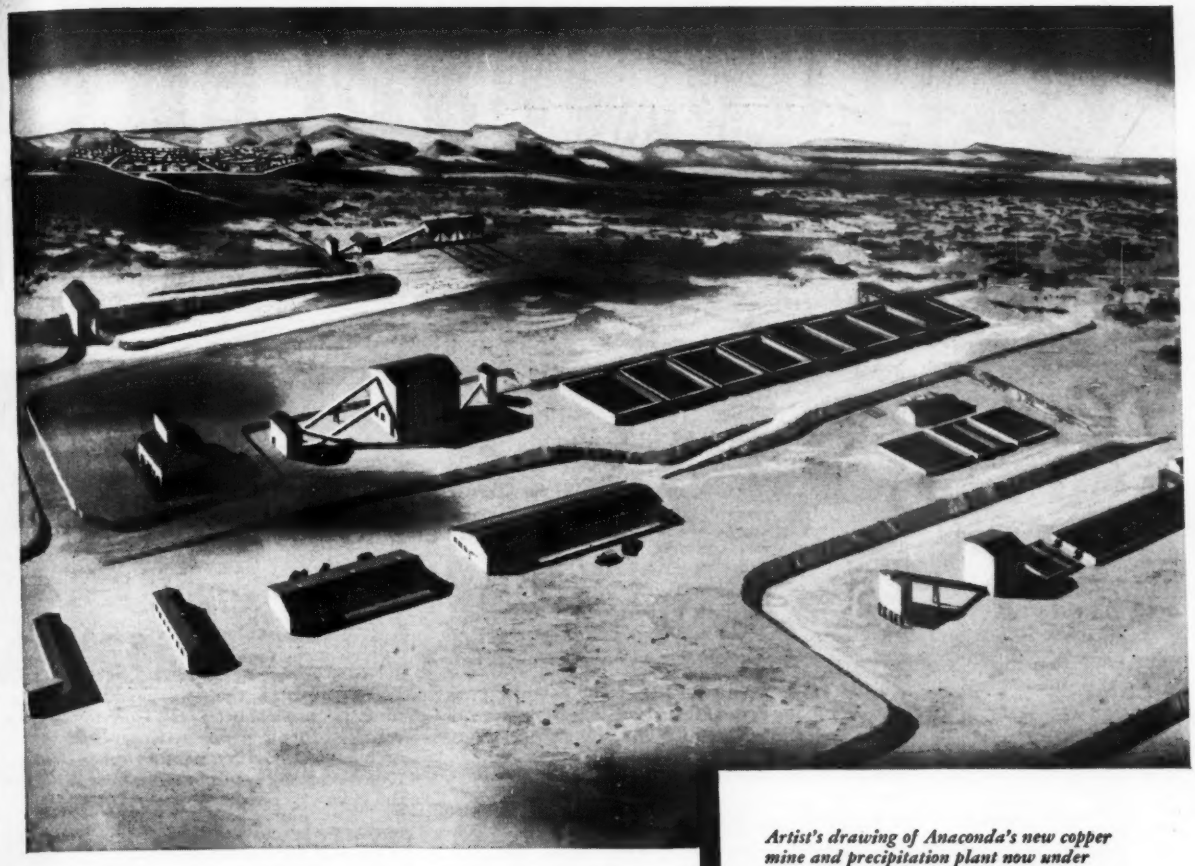
Using as standard feeder conductors a 60-lb bonded track and 350-MCM trolley with 1000-MCM feeder cable, above is a tabulation of the installed cost (in dollars) of additional bare copper cable necessary to carry various section loads with 50-v drop for distances up to 6000 ft.

In locating substations, each mine must be studied in order to determine the cost of locating the substations and the cost of bringing up high voltage ac lines. These costs can be balanced against the cost of dc feeder line and in most cases the solution is easily reached. In considering the cost of bringing up high voltage lines, thought should be given to the necessity of these lines for future extensions.

When more than one load is connected to a feeder system between substations, the calculations become rather long. The simplest procedure is to break the system down into a one line resistance and load diagram and by inspection make slide rule check calculations until the system can be balanced by voltage drop.



Size and duty of haulage locomotives are factors in feeder design, and determination of proper substation capacities



Artist's drawing of Anaconda's new copper mine and precipitation plant now under construction at Yerington, Nevada. Here open-pit mining of copper oxide ore will produce an estimated 66,000,000 pounds of copper annually. Production is scheduled to begin at Yerington late next year.

Pay-Dirt in Nevada!

The development of new ore bodies plays a vital part in Anaconda's expansion program. The Yerington property was explored and acquired by the Company during the early 1940's. Its current development is one of several Anaconda projects undertaken to increase the production of copper.

In addition to expanded mining activity, Anaconda's post-war program includes new developments in metallurgy and manufacturing. For instance, large scale modernization of manufacturing facilities results in steadily improving service for customers of Anaconda subsidiaries. At the same time, application of new mining and metallurgical methods is increasing production of all major metals in the Anaconda family. As metals grow in importance to the nation's future economy, so grows Anaconda.

Anaconda Family of Metals—Copper, zinc, lead, silver, gold, platinum, cadmium, vanadium, selenium, manganese ore, ferromanganese.

ANACONDA
COPPER MINING COMPANY

Anaconda Sales Company
The American Brass Company
Anaconda Wire & Cable Company
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Andes Copper Mining Company
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Greene Cananea Copper Company

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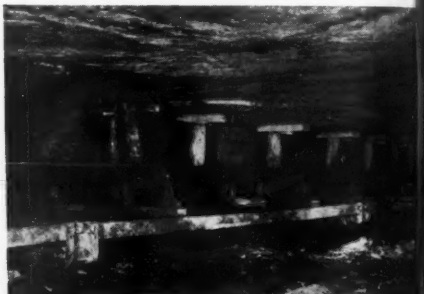
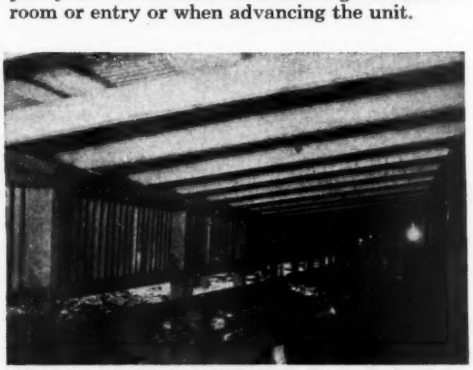
AT THE FACE, a portable Belt Conveyor takes coal *continuously* as fast as *any* machinery can produce and discharge it. The unit can be used in coal as low as 30". Rubber-tired, free-swinging casters make the portable easy to move and handle.

FROM THE FACE, the portable unit feeds the co directly onto a shuttle Belt Conveyor. The lat consists of 8' pin-connected intermediate sectio each equipped with a pair of rubber-tired whee A covered deck protects the return strand the Belt.

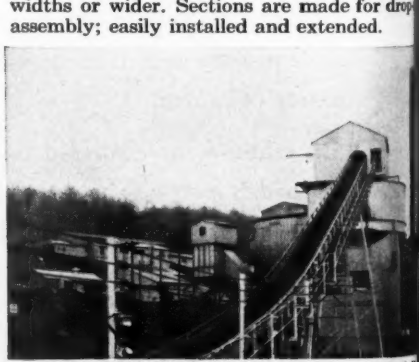
TO TRANSFER CONVEYOR. The shuttle Belt Conveyor delivers the coal onto a transfer Conveyor at a fixed-point discharge unit. The discharge pulley can be lowered when moving to another room or entry or when advancing the unit.



TO PANEL-ENTRY CONVEYOR. The transfer C veyor feeds the coal onto a panel-entry M Conveyor. The latter is assembled with 8' 10' intermediate sections of 26", 30" or widths or wider. Sections are made for drop assembly; easily installed and extended.



TO MAIN HAULAGE CONVEYOR. The panel-entry Conveyor discharges the coal onto a main line Belt Conveyor system which consists of multiple tandem units assembled from 12' rigid intermediate sections. Such systems provide haulage from 500' to 5000'.



INTO PREPARATION PLANT. The coal is deli ered from the main haulage system onto a slo Belt Conveyor (inclined or declined) for tra fer into the preparation plant. From start finish, coal transportation is *continuous*, fas economical.

YOUR COAL OUTPUT PRODUCTION COSTS!

Conveyorize your entire operation from face through tipple...with the

HEWITT-ROBINS BELT CONVEYOR MINING METHOD

Here is a *complete* "packaged" conveyor system to give you a fast, low-cost, uniform flow — from face *through* processing plant — as rapidly as any mechanism can produce your coal. What's more, Hewitt-Robins Belt Conveyors are *custom-assembled* from sturdier, heavier standard component parts *to fit your exact requirements.*

Only Hewitt-Robins can assume single unified responsibility for successful operation. Because, Hewitt-Robins is the *only* company that manufactures, within its own corporate structure, both the specialized machinery and the belt! The Hewitt-Robins Belt Conveyor Mining Method combines every element of economical Belt Conveyor performance— from designing and engineering through manufacture and erection.

HEWITT-ROBINS BELT CONVEYORIZING
Gives You These 4 Advantages

1. CONTINUOUS FLOW
2. LOW-COST TRANSPORTATION
3. GREATER OUTPUT
4. LOWER MAINTENANCE COST

For complete information on the Hewitt-Robins Conveyorizing Method — easily, quickly installed — write for full details.

HEWITT-ROBINS INCORPORATED

STAMFORD, CONNECTICUT

Desliming and thickening of flotation feed has been one of the applications of the centriclone

The Centriclone Classifier

A New Tool for the Milling Man Promises to Help Him Make Sharp Separations of Finely Ground Particles

By KELLOGG KREBS

Metallurgical Consultant
Los Angeles, Calif.

THE CENTRICLONE classifier employs the forces of the centrifuge and the cyclone with a complete control of force and time of residence to attain some unique results. A multi-bladed impeller with exceptionally heavy shaft permits the high—times G—force to be found in centrifuges, and combined with the powerful shearing action of the cyclone, creates a new tool for special jobs in the metallurgical field.

It has been widely used for subsieve sizings. Some 50 installations, largely of this type, have been made by plants beneficiating clays, talcs, bentonites, pigments, milks of magnesia and lime, etc., all on somewhat dilute or moderately viscous slurries to produce minus 10 to minus 20-micron products. Overflow at some installations contain an average particle size of two microns with the largest size being 10 to 20 microns. The factor of shape also comes into consideration, and whereas 100 percent minus 325-mesh overflows are easily attained on most slurries containing up to 25 percent solids, in other cases one may deal with a stubborn plus 325-mesh material, sometimes in the order of 0.001 percent even though the overflow product is 99.5 percent minus five microns.

Use on Thick Slurries

The use of the Centriclone classifier on thick slurries is a more recent application, and one that shows even more promise of utility than the sizings in the 15-micron range. Research and development involved modification of design, but the fundamental unique feature of the Centriclone classifier, of having complete control of force and residence time, persists.

On slurries containing from 20 to

Eliminating colloids before filtering improves filter performance

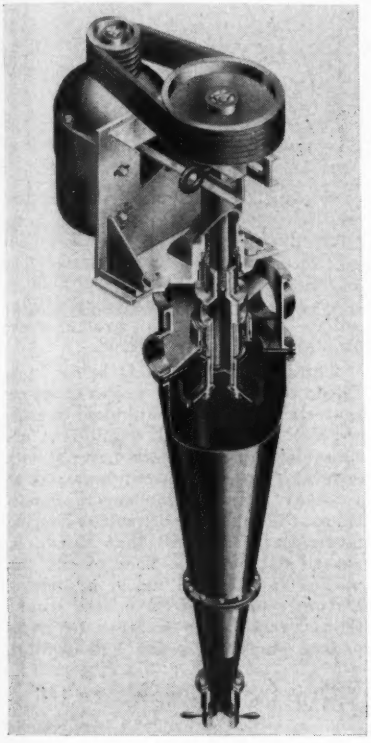
CLASSIFICATION OF THICK SLURRIES
Centriclone Separations with feeds of 48 to 68% Solids

Mesh	Feed % Wt.	Test A 48.9% Solids Underflow	Test A 48.9% Solids Overflow	Test B 55.0% Solids Underflow	Test B 55.0% Solids Overflow	Test C 68.0% Solids Underflow	Test C 68.0% Solids Overflow
+ 28	2.6	4.2		4.3		5.5	
+ 35	6.7	10.4		11.6		14.0	
+ 48	8.9	14.5		14.7		18.8	
+ 65	9.8	16.0		17.5		18.7	1.7
+100	11.2	18.0		18.9	0.2	11.4	10.8
+200	14.3	23.3	0.5	16.2	12.1	10.5	18.5
—200	46.5	13.6	99.5	16.8	87.7	21.1	69.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0
% Solids in products		73.0	28.0	75.0	37.0	78.0	60.0

as 0.3 percent plus 20 mesh, and a much higher than desirable plus 65 mesh. Conventional classification and thickening with larger diameter, shorter mills gives a more efficient use of power and grinding media. Nevertheless it was felt that if the flow rate were about doubled, overgrinding of fines would be sharply reduced and at the same time undesired tramp oversize could be eliminated from a very dense pulp.

Early this year Centriclones were put in circuit, gravity feed, with a standard 7 ft by 26 ft Allis-Chalmers mill. Comparative results (approximate averages for a month) in the wet grind of a cement plant with minus one-in. rock were as follows:

	Standard Practice	Operation with Centriclones
Production bbls/hr.	74	100
Production tons/hr.	21.4	29.0
Product % solids	63.0	64.1
Product % —200	88.0	88.0
Product largest size (mesh)	20	65
Total Kw/hr per ton	20.5	15.4



Cutaway of the Centriclone

25 percent solids it is sometimes difficult to quickly make a classification at 200 mesh that is sharp, i. e. to have the minus 200 in the underflow as low as five percent with no plus 200 in the overflow. By manipulation of all control factors of the Centriclone, it has been done on many pulps. As the density of the feed increases the tendency is for a spread in the proportions of plus 200-mesh material in the overflow and of minus 200-mesh in the underflow as shown in the following data.

Economy in power and the completeness of desliming invited the use of a Centriclone for mine fill early in 1951 on a tailing from a thickener underflow. With limited water available to aid desliming, the feed contained 35-40 percent solids. Recovery of plus 200-mesh material is substantially complete, and an excellent quality mine fill of 72 percent solids has been produced during the past 18 months in one stage operation with only about six percent minus 200 mesh in the sands.

Power Needs Low

As the pulp density and viscosity increases, the need for complete flexibility in the time and force relationship becomes more acute. At the same time the high shear action gives a classification of particle sizes due to two directional forces that makes this tool with certain control advantages of a centrifuge produce decidedly different sizing and water distribution from the normal centrifugal machines. Also, the power requirement is only a small fraction of comparable residence time in a centrifuge which consumes high energy in one directional force to produce an effect of thickening or partial filtering.

Studies on thick pulps in a pilot plant progressed to a point where overflows containing 62 percent solids and 99 percent minus 200 mesh could be made, scalping out 10 to 15 percent of the sands from 20 mesh down. Few mineral dressing flowsheets have need for fine grinding with a high pulp density, but cyanidation of certain types of gold ores and the cement industry are notable exceptions.

Increased Cement Production

It is quite a standard practice in wet grinding of cement raw materials to use long tube mills, compartmentalized, to grind to 88-90 percent minus 200 mesh. Such open circuit practice with the necessity of maintaining high density of the pulp, creates a certain tramp oversize often as much

Best on Minus 65 Mesh

It is apparent that there is a very limited use for having a Centriclone in a circuit to receive a 65-mesh grind that contains up to 65 percent solids. The water balance means a limited circulating load, and generally speaking dynamic classification is impractical for the coarse sizes of conventional classification.

For the typical tube mill fine grinding of cement plant raw materials this new technique presents numerous advantages. Mineral dressing engineers will find other special applications for work of this type. The gold metallurgist with either a water shortage or a clay-like ore difficult to settle could find it an unusual short cut to a vastly simplified flowsheet.

Operators Corner

Experimental Strip Mines Show No Stream Pollution

By DR. S. A. BRALEY
Mellon Institute

ACID pollution of streams in Pennsylvania caused by strip mines is being controlled although the work so far has been entirely experimental.

For a good part of the past six years a fellowship on Mine Acid Drainage, established by the Pennsylvania Sanitary Water Board and now supported jointly by the state and the coal industry, has been working on the problems of acid drainage from strip mines. A few principles of operation have been established by which the intelligent operator can, in most strippings of the sort found in this district, control acid drainage and, in fact, acid formation. Based upon these principles, the Sanitary Water Board has issued a number of special permits for experimental strippings on a commercial scale.

No Common Solution

Each strip mine presents its own geologic problem, but under typical conditions stripping can be done without stream contamination by following a few simple rules. These rules also have the advantage of eliminating any need for the multitude of complex and confusing regulations which would be necessary to cover all the many possible types of mines.

Sulfuric acid found in the drainage from so many mining operations results from the action of air on sulfur-containing compounds which occur in and over coal beds. It may be found whenever coal measures are exposed to air, even when a highway or railroad cutting slices through a coal seam. The acid formation isn't complete without water and, of course, unless water carries it into a stream there is no pollution problem. It is impossible to keep all water out of a strip mine, but it may be controlled so that no acid is carried out of the pit.

The first rule is to keep surface water, from the surrounding area, out of the pit, usually by a simple ditch circling the mine on the up-hill side. Spring water or seepage within the stripping can be ditched or piped directly outside.

Second, sulfur-bearing shale, rocks, and low-grade coal uncovered in stripping must be separated and kept out of the way of flowing water. The floor of the pit must be kept clean, so machinery won't crush and spread the sulfur-bearing materials around where rain can soak out the acid.

Third, while the pit is being back-filled, the segregated sulfur-carrying materials should be bull-dozed against the foot of the "high wall" (the up-hill side of the cut), and covered with several ft of compacted material as removed from the top cover. Sometimes the amount of sulfur-bearing material is so small that it can be spread out over the floor of the cut, packed down by rolling, or by driving a tractor back and forth over it, and then covered with a layer of hard-packed clay before the cut is filled.

Acid water can be prevented from flowing into the streams

Drain Surface Water Off

Then, with the back-fill being made against the high wall, it is smoothly sloped, so that rain and surface water will drain away quickly without soaking into the ground or standing in pools. The fill should be built up against the high wall carefully, so that it will not slip down or away, leaving a crack into which run-off water can pour.

In some strippings, when the coal is quite deep, or below the water level of the surrounding country, back-filling may not be needed. The sulfur-bearing waste may be spread on the floor and covered with clay after which the mine is allowed to fill with water, which will effectively seal off the air. Once the acid which was actually produced during the mining is drained off, only clean water will flow from the mine, because no air can get to the surfuritic material to make more acid. This is the condition

(Continued on page 67)

Representatives of the English coal industry studied our coal industry to see ways in which their production could be increased

Reviving the British Coalfields

By HAROLD HUTCHINSON

An English industrial correspondent and one of the British Broadcasting Corporation's economic analysts

FOR the first time since the war Britain can face the winter with the certainty of sufficient coal to keep industry going in full production. Output per man is now at record levels, the flow of recruits to mining is increasing, the long preliminary work of modernizing old mines is now beginning to pay dividends, and the prospects of an increasing margin of coal for export are good.

It has taken five years of effort, despite many setbacks, to revive the old coalfields, with their background of the long period of depression, and six war years of ruthless exploitation, during which coal had to be produced as easily and quickly as possible, regardless of the future difficulties created.

Making the Industry Attractive

An industry with the worst possible reputation and the worst of labor relations had to be made attractive in a period of full employment. Millions of pounds had to be poured into the mines with no hope of return for many years.

In this process Britain had to accept an annual coal crisis. With industrial production running 50 percent above pre-war levels, the demand for coal rose by millions of tons every year. For five years, week by week, the figures of coal production and stocks have been studied anxiously, particularly as the winter approached —the period when consumption always exceeds production, and stocks must be there to make up the deficit. A shortage of two or three million tons in a bad winter can spell industrial paralysis.

That happened in 1947 but has been narrowly averted each year since. This year coal stocks are already far higher than they have ever been since the war at this season, and exports are being increased by 2,000,000 tons.

If production continues to rise through the summer, still more coal may be released for export to Europe, and so save Western Europe the necessity of having to spend dollars and use valuable shipping space to bring coal across the Atlantic. Furthermore, in exchange for more British coal, Britain can be sure of more high grade iron ore for her steel industry.

This is the picture presented by Britain's National Coal Board in its fifth report since it took over the mines five years ago. In those five years annual production has gone up by 30,000,000 tons. Productivity has risen each year. Step by step the miners' standard of living has been

The shortage of manpower has been one of the deterents to coal production

Recruitment has finally caught up, and in 1951 there was a net gain of 9300 men in England's coal industry

raised, working conditions improved, and earnings increased so that they are, on an average, the highest in the United Kingdom's industry.

More Men Work on Saturdays

In 1951, with 900 mines and 700,000 men, there was only one dispute of any significance. In recent months the flow of recruits to mining has exceeded the number of those who left. More and more men are working an extra—voluntary—shifts on Saturdays.

Men were needed desperately in the mines, but in a democracy they must go voluntarily or not at all. For years it seemed that recruitment would never quite catch up, but it has done so now—without any direction of labor. In 1951 there was a net gain of 9300 men, and the gain has continued this year.

It will still be many years before the reorganization of the coalfields can be regarded as complete, and it will be years before Britain can export coal in anything like pre-war quantities. But she can look forward to rising exports, which will benefit not only her own, but most of Western Europe's economy.

All Europe has faced coal problems since the war and mostly for the same reasons—unavoidable wartime neglect and destruction, the loss of German production, and shortage of manpower. Britain was the first to recover to pre-war production levels and resumed exports in 1947. By running stocks to the danger level constantly ever since, exports have been pushed up as high as 14,000,000 tons, but fell last year to 8,000,000 tons. This year they will be about 11,000,000 tons.

Since the war Britain has exported about 46,000,000 tons, but in the same period Europe has had to import nearly 90,000,000 tons of American coal. Every additional ton that Britain can release for export is therefore vital to Europe.

Insuring Against Emergency

Britain herself has imported over 1,000,000 tons of American coal as an insurance against an emergency and to enable her to fulfill her own firm commitments to other countries. As American coal cost twice as much as the British export, it was an expensive operation, but it was undertaken to avoid breaking contracts with those countries which Britain traditionally supplies.

It is unlikely that Britain will ever again have to import coal. There is still no surplus, and Britain and all Western Europe would be economically healthier if Britain could produce another 20,000,000 tons. But the years of coal crises are over.

Wire Rope in Mining

(Continued from page 24)

severe at certain definite points on wire rope using equipment, and the cutting off of a short length of rope subjects different portions to these destructive forces. A wire rope is usually changed end for end to distribute the wear and fatigue resulting from bending and vibration. If these destructive forces are uniform throughout the system no economy is affected by such change. However, on most installations these forces are more severe for one half of the rope than for the other and reversing the ends increases rope life.

Keep groove diameters of sheaves and drums proper size—avoid pinching rope. Grooves that are too narrow prevent proper seating and will pinch and distort the rope causing wear and internal stress. If grooves become scored or fluted, replace or repair.

Avoid flange wear. Usually the result of bad sheave alignment. Promptly replace sheaves with broken flanges, and line up, with proper "Fleet-Angle."

Avoid looping and kinking. A pulled down loop or a kink in a wire rope will greatly reduce its life. No matter how well a loop or kink may appear to be straightened, the rope is definitely weakened and permanently damaged at this point.

Lubricate regularly. Wire rope is a machine and requires adequate lubrication. Periodical application of a good grade of wire rope lubricant specially designed for the purpose, is absolutely essential. An internally corroded or a rusty rope is a definite liability and a safety hazard.

Avoid dragging rope over obstacles. The use of *supporting* sheaves and rollers decreases the wear on rope and, spotted at irregular intervals, tends to dampen vibration on long inclines or where operated at comparatively high speeds.

Periodic inspection. All wire rope should be carefully examined in view of the dangers and damage involved should a wire rope break prematurely or without warning. Eventual failure by the progressive development of broken wires as a result of wear and fatigue can easily be detected before ultimate service is reached.

Good Advice

As a final suggestion, always procure a wire rope from a reputable manufacturer. There can and should be no compromise with quality in the design and fabrication of wire rope. Wire ropes all look pretty much alike, but there are many hidden qualities starting with the melting and refining of steel, continuing through heat treating processes, cold drawing of the rope wire and final fabrication. Quality control of all the chemical and physical properties of basic and finished material, combined with intelligent selection, use and care, assures the safe, efficient, dependable and economical performance so essential to the mining industry.

WEMCO 66-inch duplex classifier built for a large Canadian operator.

Two 60-inch, series 150 WEMCO S-H Classifiers in the regrind circuit of a large lead-zinc concentrator.

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*QUARTER-MILE ROADBED...sun-baked, ice-swept...*YET STILL ON THE MOVE AFTER 14 YEARS OF COAL HAULING SERVICE!!!

Photographs may not lie; but, here's one that falls far short of telling the whole truth about the remarkable performance records chalked up by this Republic Rubber's Coal Handling Conveyor Belt.

But, then it's quite a story! You can see for yourself there's lots of sky overhead and that means sun . . . constant, unrelenting sun beating down on the conveyor belt surfaces, until seasonal changes bring about onslaughts of rain, snow and sleet.

The load, of course, is coal . . . an abrasive, mine run coal that's dropped through chutes and carried by the belt to stockpiles located throughout the dock area.

With these facts in mind and knowing that when the ship moves out, there's nothing to protect the belt against spraying lake water, consider this:

The belt is now fourteen years old and still going strong!!!

Purposefully, we've left the photo unretouched to show you just what a 14-year old Republic Rubber Conveyor Belt really looks like . . . to show you just how well a Republic Conveyor Belt stands against the ravages of time, hard labor and all the elements can throw at it. Incidentally, the dark spots you see on the belt's surface aren't worn places at all. That's water . . . water that makes ordinary conveyor belts mildew and prematurely fail, but holds few terrors for Republic Conveyor Belting because they're "mildew-proofed"!

It's to your advantage to learn why Republic Conveyor Belts like this can year in, year out, many times outperform and outlast other brands of belting.

Despite abrasion, impact, flexing, weathering or contact with heat, oil and chemicals, Republic Conveyor Belts continue to be your best insurance against breakdowns, short life and high handling costs.

Write us today for the name of your local Republic Rubber Distributor who can offer expert advice and fast service on all industrial Rubber Products.

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Wheels of GOVERNMENT

AMC

As Viewed by A. W. DICKINSON of the American Mining Congress

AS the political campaigns unfold there are recurrent announcements, partaking perhaps of the nature of political "trial-balloons," that the President may bring Congress back to Washington to work on anti-inflation controls. The rumors, however, are discounted by the Chairmen of both the Senate and House Banking and Currency Committees, who have expressed doubt that a special session would result in a stronger controls law.

The easing of the tight situation in most metals—copper and aluminum have just been taken off the Defense Production Administration's critical list—is accompanied by discussion of administrative changes in the overall defense mobilization setup. According to current reports DPA would be merged with the Office of Defense Mobilization, and NPA would be made an operating division of the Commerce Department.

Advisory Councils Dissolved

The National Minerals Advisory Council and the National Bituminous Coal Advisory Council have been ordered dissolved September 12 by Interior Secretary Oscar Chapman. It is reported, however, that the Secretary has told members of the National Petroleum Council, which also has functioned under the Department of Interior, that if necessary he will go to the White House to urge its retention in status quo.

The two Councils which are ordered dissolved were organized on the pattern of the Petroleum Council, their formation having been originated by former Interior Secretary Krug at the 1946 Convention of the American Mining Congress in Denver. These Councils included in their membership many leading mining men of the country in the metals, nonmetallics and coal industries. The members served in a purely advisory capacity to the Secretary of Interior.

While Chapman stated that he wished to retain these services through the minerals and coal Councils, he said the Attorney General had stated that the organization and operation of these bodies failed to meet the minimum requirements specified by the Department of Justice for industry advisory committees.

Coal Wage Contracts

Negotiations for a new wage and working agreement are continuing intermittently between representatives of bituminous coal producers and the United Mine Workers of America. Separate negotiations have also been begun between anthracite producers and the UMWA. No specific demands on the part of the Mine Workers have as yet been made public. The original UMWA notification is for termination of the bituminous coal wage contract after 60 days following July 22.

With an 84-day supply of coal reported in storage above ground, the mine workers' President on August 16 ordered his members to observe a 10-day "memorial period" extending from August 23 through September 1. Maintenance, repair and construction workmen are continuing to work while the mines are idle.

The notice of the "memorial period" was carried in the *Mine Workers Journal* and was addressed to the attention of coal operators, union members, U. S. Bureau of Mines and Federal Inspectors, State Mining Departments and State Inspectors. The *Journal* went on to state in part: "During this Memorial Period when production is abated, the management of each mine, with the cooperation of each mine worker, should place it in a legally safe condition; ventilation should be made adequate to meet all standards and any barometric change; air courses and haulage roads should be made clean; accumulated coal dust should be removed; rock dusting should be completed to meet requisite standards; all machinery and electrical equipment should be put in order; and all other necessary steps should be taken to make each mine not only legally and contractually safe, but safe from every standpoint of collective good judgment and sound mining practice."

The *Journal* urged the Bureau of Mines and the State Departments of Mines to insist upon compliance by mine management with safety instructions previously issued by those agencies.

Meanwhile, the UMWA Welfare and Retirement Fund in its annual report for the fiscal year 1952 shows a balance of nearly $100,000,000 as of June 30. Expenditures reported are as follows: paid out in benefits, $126,338,269; pension payments, $51,762,639 to 45,339 retired miners; hospital and medical expenses, $49,996,517.

Coal Mine Inspection

In carrying out the administration of the Neely Federal Coal Mines Inspection Act, the President has appointed the three members of the Federal Coal Mine Safety Board of Review. The Act provides that the Board shall be created to receive and rule upon appeals from orders of Federal mine inspectors which result in the closing down of mines or parts of mines.

Chairman of the new Board is Alex U. Miller of Vincennes, Ind., a retired official of the U. S. Bureau of Mines. Representing the coal miners is Charles R. Ferguson, acting safety director of the UMWA, and now also serving as Deputy Solid Fuels Administrator in charge of manpower. Representing coal producers is Joseph G. Solari of Chicago, assistant general manager of the Peabody Coal Co.

Washington Highlights

CONGRESS: President may recall?

ADVISORY COUNCILS: Dissolved.

COAL WAGE: Negotiations on.

COAL MINE SAFETY: Review Board appointed.

AMC Personals

The position, chief of the Health and Safety Division, U. S. Bureau of Mines, vacant since J. J. Forbes was named director of the Bureau, has been filled by **James Westfield**, Pittsburgh, Pa. Westfield has 24 years of service with the Bureau. **W. H. Tomlinson**, Vincennes, Ind., succeeds Westfield as chief of the Bureau's Accident Prevention and Health Division, Region VIII, at Pittsburgh.

James Westfield

Raymond T. Whitzel has been made general manager of the smelting division of Aluminum Co. of America, succeeding **V. C. Doerschuk**, who has been general manager of that division since 1935. Doerschuk will become technical consultant, chiefly on aluminum smelting and related problems.

Henry R. Platt, Jr., vice-president of the Continental Illinois National Bank & Trust Co. of Chicago, became vice-president and treasurer of Truax-Traer Coal Co. on September 15, R. E. Snoberger, president of Truax-Traer, announced.

Platt succeeds **J. O. Westlund** who is retiring at his own request after 25 years' service with the company which he joined a few months after it was organized in 1927. Westlund will continue as a member of the board of directors and will serve the company in an advisory capacity.

J. B. Haffner, general manager of Bunker Hill & Sullivan Mining & Concentrating Co., has been elected to the Board of Directors of Idaho Custer Mines, Inc.

R. C. Fitzgerald, vice-president in charge of The West Virginia Coal & Coke Corp., recently retired from active duty. He has been confined to his home by illness since August, 1950.

Fitzgerald joined West Virginia Coal & Coke in 1927 as general sales manager and was elected vice-president in charge of sales in 1936. Although retiring from active duty, he will continue in a consulting capacity on sales matters.

Andrew Milavec is now superintendent of Montour No. 9 Mine of the Pittsburgh Coal Co. Division of Pittsburgh Consolidation Coal Co., replacing Robert Atchison, resigned. Prior to this appointment Milavec had served in various official capacities for Pittsburgh Coal.

Joseph C. Kieffer was recently appointed assistant manager of American Smelting & Refining Co.'s operations in Salt Lake City. For the past four years Kieffer had been general manager of the Spokane-Idaho Mining Co.

Dr. **Cyril Stanley Smith** of Chicago a former member of the Manhattan Project, will be awarded a Francis J. Clamer Medal by The Franklin Institute of the State of Pennsylvania for his metallurgical contribution to the development of atomic energy during and since World War II. Dr. Smith is professor of metallurgy and director of the Institute for the Study of Metals at the University of Chicago.

Formal presentation of the medal will be made at the Institute's Medal Day ceremonies on October 15. The citation accompanying the award states that Dr. Smith is being honored "in recognition of his work leading to knowledge of the basic factors of the metallurgical behavior of elemental plutonium essential to the development of nuclear energy."

According to a recent announcement, **Paul Billwiller** has been promoted to mine foreman at the Bluff Mine of the Britannia Mining and Smelting Co., Britannia Beach, British Columbia.

Britannia Mining and Smelting is an operating subsidiary of Howe Sound Co.

Two appointments were recently made in the Pocahontas Land Corp., according to R. H. Smith, president. **W. R. Graham**, was named vice-president and general manager and **J. M. B. Lewis, Jr.**, was named assistant general counsel.

L. A. Van Fleet has resigned from the Bureau of Mines to accept a position as safety engineer for Minas de Matahambre, Pinar del Rio, Cuba. Van Fleet has been with the Accident Prevention Branch of the Bureau of Mines for the last 10 years as a safety representative.

Edward Prostel, for many years superintendent of the Lehigh Briquetting Co., Dickinson, N. D., has been named to work in the coal research section of the Natural Resources Research Institute at the University of Wyoming. His work at Dickinson pioneered the briquetting of lignite in the state.

Hugh Sutherland Lewis has been appointed executive vice-president of Michigan Limestone Div. of the U. S. Steel Co. Since 1926 when Lewis joined the engineering department of Michigan Limestone, he has held various positions in that department and in 1945, became vice-president of operations, a post he has held since that time.

Gordon G. Bonnyman has been appointed general manager of mines for the Blue Diamond Coal Co. He succeeds **Charles B. Jackson**, who retired because of ill health.

Sheldon P. Wimpfen, Jr., is now working for the Mining Research Corp. in the West.

According to a recent announcement by Philip L. Ray, president of the Great Northern Iron Ore Properties, **W. C. Flinn** has been elected executive vice-president of Great Northern.

Dr. **Robert L. McMurtrie** is now superintendent of the lignite research laboratory at Grand Forks, N. D., and chief of the lignite branch of the Bureau of Mines, Region V, Fuels Technology Division.

The appointment of **Koehler S. Stout** to fill the position in the Mining Department of Montana School of Mines left vacant by the death of Professor O. A. Dingman last December, was announced by President J. R. Van Pelt.

C. O. Stephens, H. W. Strickland, and **A. G. Wolf** have been elected vice-presidents of the Texas Gulf Sulphur Co., according to a recent announcement by Fred M. Nelson, president of the company.

The Truax-Traer Coal Sales Co. announces that at its recent annual meeting, **George F. Kisker, Jr.,** was elected president succeeding **M. L. Patton** who was elected chairman of the board. Kisker was formerly vice-president. **Walter Nichols** was elected vice-president to take office in September.

Lawrence Litchfield, Jr., has been elected president of Alcoa Mining Co., New York City, and of Surinaamsche Bauxite Maatschappij, Paramaribo, Surinam, both subsidiaries of Aluminum Co. of America. He succeeds **Frank B. Cuff,** who retired August 1.

L. Litchfield, Jr.

Litchfield, who has been serving as vice-president of Alcoa Mining Co. and Surinaamsche Bauxite Maatschappij, is a veteran of 27 years' service with the company. He is a graduate of the United States Naval Academy where he received his ensign stripe in 1920. Following a year in the Navy, he took post graduate work at Harvard. He was graduated magna cum laude with a B.S. degree in mining in 1923. After a period of service with the U. S. Bureau of Mines, he joined ALCOA in 1925 as geologist and mining engineer. He is also president and director of Alcoa Exploration Co.

F. B. Cuff

Thomas W. Mather has been named superintendent of the Munson No. 14 Mine of the U. S. Steel Co.

Before joining U. S. Steel last October, Mather was general mine foreman in the Semet-Solvay Division of Allied Chemical and Dye Corporation at Tralee, W. Va.

Harbison-Walker Refractories Co. announces the appointment of **Miro Mihelich** as manager of Harbison-Walker Minerios, Ltd., a subsidiary company organized for developing sources of raw materials in Brazil.

Mihelich, who has worked in the Mining Department of Harbison-Walker since 1947, is a graduate mining engineer from the University of Idaho. In recent years most of his work has been in the field of mineral exploration.

Frank J. Cservenyak has been named chief of the Light Metals Branch in the Minerals Division of the Bureau of Mines. **Delwin D. Blue** was named assistant chief.

Edmund C. Bitzer, Golden, Colo., vice-president and general manager of Colorado Iron Works Co. recently resigned from that firm to take a position as metallurgical advisor, Raw Material Division, U. S. Atomic Energy Commission.

Fred T. Wiggins, vice-president and general sales manager of Universal Atlas Cement Co., announced the retirement of **A. C. Cronkrite,** who since 1937 has been vice-president, central region sales, Chicago, of this U. S. Steel Corp. subsidiary. Also announced by Wiggins was the election of **George S. Neel,** western region sales manager, as vice-president, central and western region sales, Chicago.

Announcement has been made of the appointment of **Donald E. Moulds** as general manager of the Mining Division of the Copper Range Co., with headquarters at Painesdale, Mich. Moulds received his Mining and Geological Engineering degrees from the South Dakota School of Mines and comes to the copper country from Washington, D. C., where he has been with the Defense Materials Procurement Agency as Chief of the Base Metal Division.

On August 1, **Henry A. Dierks,** vice-president and general manager, Glen Alden Coal Co., Wilkes-Barre, Pa., resigned as a result of a serious eye ailment with which he was stricken earlier this year. Dierks had been with Glen Alden since November, 1943.

– *Obituaries* –

Whipple Jacobs, president, Phelps Dodge Copper Products Corp., died suddenly August 18 at his home, Fox Hollow, Pipersville, Bucks County, Pa.

Formerly president of the Belden Manufacturing Co., Mr. Jacobs became president of Phelps Dodge Copper Products Corp. on January 1, 1949.

Frank S. Easley, 73-year old coal operator, died recently. Mr. Easley was president of the Bluefield Coal and Coke Co. from 1914 until the company was liquidated in 1950. He was also chairman of the Board of Directors of the Southern Coal Co., president of the Clintwood Coal Co. of Kentucky, and of the Graham Smokeless Coal Co.

J. Newman Shook, 59, president of the Twin Seam Mining Co., died in late April at Birmingham, Ala. Mr. Shook has been connected with the Twin Seam Mining Co., previously called the Central Iron & Coal Co., since 1913.

William M. Ritter died in Washington, D. C., at the age of 88. A great industrial leader, he was a coal man through his connection with the Red Jacket Coal Corp.

Jack W. Clark, head of Jack W. Clark Associates, died in Madagascar, August 8. He was a geological and mineralogical consultant for The Beryllium Corp., and at the time of his death, was on assignment to Africa and Madagascar for the exploration of beryl ore, rare earths, and other associated minerals. Mr. Clark was formerly associated with the U. S. Bureau of Mines and was considered one of the outstanding men in his field.

Harry P. Pearson, prominent north Idaho mining man, died in Wallace on June 9. A heart attack claimed his life while he was on an inspection trip to the Idaho Custer Mine. Mr. Pearson headed the Idaho Custer Co., and was also president of the Silver Summit, Reindeer Queen and Pearson mining companies. He was 59 years old.

Firmin V. Desloge, 73, died at Santa Barbara, Calif., where he had resided for the past five years. He was vice-president of the Desloge Consolidated Lead Co. until its merger with the St. Joseph Lead Co. The Desloge family operated lead interests in Missouri for more than 100 years.

Funeral services were held recently at Pocatello, Idaho, for **Ronald H. Abbott,** 62, a mining engineer. His work included development of the Great Botami mine.

William John Evans, 68, chief coal mine inspector for the State of Washington, died in mid-August. He suffered a heart attack during a routine underground inspection. Mr. Evans had been chief state mine inspector in Washington since 1945. He had been awarded the Joseph A. Holmes Safety Association's certificate of honor three years ago for working 53 years in his native Wales and in the United States without a lost-time accident.

Build New River Dock

Contract for construction of new harbor facilities at the Weirton, W. Va., plant of Weirton Steel Co. has been awarded to The Contracting Division of Dravo Corp., Pittsburgh.

The harbor, 1796 ft long, adjoins Weirton's present river docking facilities. A 400-ft loading dock, consisting of five 54-ft diam connected circular steel sheet pile cells, will be constructed near the upstream end of the harbor. At this location Weirton will erect a new warehouse equipped with an overhead crane to load and unload barges and railroad cars.

In addition to the five dock cells, there will be one 30 ft diam supporting cell, two 40 ft diam ice breakers at the upstream end of the harbor, 14 barge mooring cells of 16 ft diam, and four 40 ft diam cells to divert sewer flow and support a new two-track railroad trestle leading to the dock.

To provide necessary depth in the harbor for barges, some 27,000 cu yd of rock must be removed from the river bed. A special barge is being equipped to handle underwater drilling, loading and shooting of dynamite. Rock shot out will be placed as rip rap on the steep river bank. It will also be necessary to dredge about 25,000 cu yd of river deposits to deepen the harbor.

New England Mica Depot

Plans are being completed for the establishment of a purchase depot for high grade mica at Franklin, N. H., it has been announced by Jess Larson, Administrator of General Services and of the Defense Materials Procurement Agency. The new station, similar to ones now being set up at Spruce Pine, N. C., and Custer, S. D., will be operated by the Emergency Procurement Service of GSA for DMPA.

The Government is primarily interested in hand-cobbed or processed mica that will yield satisfactory quantities of strategic grades of that material. Forty-five lb of block or film mica are the minimum individual shipments that will be accepted at the purchase depot, while hand-cobbed mica must be offered in lots of at least 1000 lb.

The domestic purchase program is set up to run to June 30, 1955, or until total block, film and hand-cobbed mica delivered to and accepted by the Government has reached the equivalent of 25,000 short tons of hand-cobbed mica.

Uranium Handbook Revised

A revised edition of the pocketsized handbook, "Prospecting for Uranium," is now available from the Superintendent of Documents at the Government Printing Office in Washington, D. C. Its price is 45 cents.

Published jointly by the Atomic Energy Commission and the U. S. Geological Survey, the new edition contains for the first time eight color reproductions of common uranium bearing ores to supplement the descriptive material. It is designed to answer all the common inquiries received by the government agencies regarding the AEC's drive to encourage domestic uranium production.

Develop Greenland Lead

According to Danish Prime Minister Erik Eriksen, the Danish Government has decided to form a company to develop lead deposits found in northern Greenland. Swedish and Canadian interests were each prepared to contribute 15 percent of the needed capital. The remaining 70 percent would be made up by Danish industrialists and banks. Prospecting is scheduled to start this summer.

Producing Ferro Silicon

Vitally needed ferro silicon for the nation's vastly expanded steel industry began flowing from a former farm on West Virginia's western border on June 16. Production was scheduled to begin in the first electric arc furnace of the new, unfinished, $8,000,000 plant of Vanadium Corp. of America, near New Haven, Mason County, on the eastern bank of the Ohio River. The announcement was made by William C. Keeley, president of Vanadium Corp.

Four more furnaces at the new Graham plant are scheduled to be placed in operation soon. These furnaces are among the largest and most efficient in the alloy-producing industry. They are 22 to 25 ft in diameter, with three huge electrodes in each. Electric power to operate the furnaces which have an overall rated capacity of 50,000 kilowatts is derived from the nearby Philip Sporn generating plant of Appalachian Electric Power Co., one of the associate companies in the American Gas & Electric System. The power is obtained under provisions of one of the largest initial contracts executed between any American Gas & Electric operating company and one of its customers.

Win Holmes Safety Award

Presentation of the coveted Joseph A. Holmes Safety Association award to Lansford Colliery of the Lehigh Navigation Coal Co., Inc., was a feature of the Company's 18th First Aid meet August 16.

Lansford Colliery won the acme of all safety honors for its record of having worked nearly 4,000,000 manhours without a fatality from 1949 to 1952, with an average of 1153 employes.

From left to right are John J. Forbes, director of the United States Bureau of Mines, who came from Washington to present the award, named in honor of the first director of the Bureau; George H. Lovell, superintendent of Lansford Colliery; Fred Gallagher, United Mine Workers of America, and Evan Evans, president of the Old Company.

Coke Production in 1951

A new all-time peak in coke production in the United States was attained in 1951, according to data submitted by coke producers to the Bureau of Mines, United States Department of the Interior. A total of 79,330,702 net tons of coke, excluding breeze, was produced, which represented a gain of nine percent over the 1950 output and exceeded the previous maximum of 1948 by 4,468,774 tons. This record was made possible by the efficient coordination of labor and management in mining, transportation, steel, and other basic industries which permitted coke producers to maintain extremely high-operating rates throughout the year. Slot-type coke ovens operated at the second highest production rate on record—96.5 percent of capacity, compared with the all-time peak rate of 96.9 percent during 1942, the first year of World War II. Beehive-coke output, the highest since 1943, declined slightly in the latter months of the year from the high rate in January and was nine percent of the total coke production.

New Anthracite Fellowship at Mellon Institute

The Philadelphia & Reading Coal & Iron Co., Philadelphia, Pa., has resumed comprehensive scientific research in Mellon Institute, Pittsburgh, according to an announcement by Dr. Edward R. Weidlein, president of the Institute. During the period 1932-37 the Philadelphia & Reading Coal & Iron Co. sustained in the Institute a multiple fellowship that related to studies of problems in the mining, preparation, transportation, marketing and utilization of anthracite. This broad program was later extended to the anthracite industry in general, 1937-47. A number of contributions to knowledge came from the projects of this fellowship, which during its later years gave special attention to the handling and uses of anthracite ash.

The new fellowship will investigate problems of today and tomorrow in the production, preparation, transportation, marketing and utilization of anthracite, both as a fuel and as a source of chemicals. James H. Black, who has had much basic research training and experience concerning fuel technology, has been appointed to the fellowship. Previously Black served as an instructor in chemical engineering at the University of Pittsburgh and also carried out investigational work in Mellon Institute.

Old Company Picnic

For the 10th year the Old Timers Club of Lehigh Navigation Coal Co. gathered at the company's Greenwood Lake near Lansford, Pa., on August 2. They devoured dozens of chickens, countless ears of corn, buckets of clams, welcomed 21 new members into the club, and returned for more food.

All 269 members, refer to their club as the "most exclusive club in the world." And rightly so considering that membership is not open until an employe has 50 years' service with the Lehigh Navigation Coal Co. Of the 269 members, 82 still are actively employed as miners or mine workers. Their ages range from a "young" 64 to 87.

Highlight of this and all former outings came at lunch when the Old Timers sat down at long picnic tables and waited to be served by bosses and former bosses. Evan Evans, coal company president, led a corps of waiters made up of company supervisory personnel.

Following lunch, president Evans welcomed the 21 new members and gave each the distinctive Old Timers lapel button, signifying admission to the group.

The club's two "champion" members were on hand, as they have been since the club was formed 10 years

ago. Harry Shires of Summit Hill, who will be 81 next birthday, worked for the company 69 years before retiring several years ago. He started as a breaker boy at the age of nine. William W. Bobst of Lansford worked 66 years before retiring. He is 87.

The more than 200 at this year's affair made it one of the best attended in the last 10 years, in spite of a steady rain that lasted most of the day. The rain, which eliminated any thought of quoits, always a popular game, did little to affect the spirits of the Old Timers. When they weren't eating or singing, they gathered in small groups and reminisced about coal mining as it was done in their time.

Ocean-Going Ore Fleet Grows

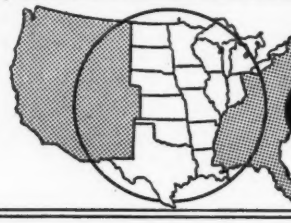
There are now ten ships making regular deliveries of iron ore from Chile and Venezula to this country. Two vessels to carry Liberian ore from Monrovia to Baltimore were christened in Scotland in 1951. At least two carriers are being built to carry Quebec-Labrador iron ore from the port of Seven Islands. Still more vessels are planned for the growing fleet of ocean-going iron ore transports. This fleet is carrying iron ore from foreign countries to blast furnaces located, primarily, in the eastern United States. Capacity of the newer vessels is larger than that of the Great Lakes ore boats, however, they take a longer time to make a round-trip. For instance 25 days are required to make the trip for Liberian ore as compared with the 4½ to seven days required to take ore from the head of the Lakes to Lower Lake Ports, and return.

Studies U. S. Mining

A young Greek mining engineer who is in Panther Valley to study hard-coal mining methods finds that mines in his country and the coal measures here have one thing in common.

"Our veins in Greece are like yours—they're heavily pitched," said John Economopoulos, whose home is in Athens. Apart from coal itself, John is most impressed with the high degree of mechanization. "I am astonished at the number of tools and machines you provide for your workers," he said.

John is here as the guest of the Lehigh Navigation Coal Co., by arrangement with the Mutual Security Administration. In line with its aim to improve the self-sufficiency of European countries the government is aiding Greece in its efforts to develop lignite resources. John is one of several Greek mining engineers who will spend a year in this country before going back home and putting to work some of the techniques learned in the United States.



Central States

Freeman Coal Moves Office

Freeman Coal Mining Corp. has moved its general offices from 208 South La Salle St. to 300 West Washington St., Chicago 6, Ill. The telephone number of the mining company is unchanged.

To Recover Manganese Cheaply

Manganese Chemicals Corp., of Minneapolis, and the U. S. Government, have entered into an agreement which paves the way for recovery of manganese in quantity from vast deposits of low-grade ores in the Cuyuna Range in Minnesota.

The private corporation will build a "prototype" plant to recover manganese by a chemical leaching process, known as the ammonium carbonate or Dean process.

Cost of the new facility will be approximately $2,000,000, of which the Government has agreed to advance up to $1,500,000, to be repaid with interest as production progresses.

Lignite Stripping Feasible

The U. S. Geological Survey has suggested that profitable strip-mining operations could be developed in the lignite fields in Harding and Perkins Counties in South Dakota. The government agency has finished appraisal of lignite reserves in the state which total 2,033,000,000 tons.

Explores Michigan Holdings

The Ford Motor Co. has undertaken an intensive geological exploration for new mineral formations in its land holdings in Michigan's Upper Peninsula. Trained crews of geologists and geophysicists are covering the huge Ford holdings in Baraga, Dickinson, Marquette and Iron Counties in their search for iron ore and other minerals which have potential value.

Anticipating future production from low grade ores, not now economical to produce, Ford signed an option and lease agreement including all of its southern Dickinson County properties with M. A. Hanna Co. in 1949. Hanna has built a pilot iron concentration plant to develop techniques for the benefication and concentration of the type of ore found on Ford property.

Ford also has encouraged exploration for uranium-bearing materials on its lands and has conducted drilling in Northern Baraga and Marquette Counties with the U. S. Atomic Energy Commission.

Annual National Safety Congress

The National Safety Congress will celebrate its 40th birthday this fall when it holds it 40th annual meeting in Chicago on October 20-24. Twelve thousand people are expected to attend the safety event, which will include exhibits covering all types of safety aids.

Based on the accidental death rate in 1913, and in succeeding years, 500,000 lives have been saved since the first Safety Convention was held. Safety leaders point out, however, that the toll still is so huge, it staggers the imagination—94,000 killed and 9,400,000 injured in 1951 alone.

Open Mine in October

A stripping program at the Lind-Greenway Iron Property of the Minnesota Ore Div., Jones & Laughlin Steel Corp. is scheduled to begin in October. The property is on the western end of the Mesabi iron range, five miles northeast of Grand Rapids, Minn. The Lind and the Greenway properties have been consolidated into one operation.

Add to Mine Rescue Facilities

Four "safety stations on wheels," ready to roll at an instant's notice, now spearhead the mine rescue organization of the State of Illinois. The Illinois Department of Mines and Minerals has just added its fourth such unit—equipped with every emergency device and life-saving instrument that might be needed—and located it at a strategic point in the mining area where trained men maintain a 24-hour vigil.

These units are in addition to the safety and rescue equipment permanently located in mining communities.

Three of the mobile units were obtained shortly after World War II, when the necessary equipment again became available.

The "Mobile Safety Stations" are designed to serve five purposes.

They serve as:

(1) **Mobile rescue stations,** always alert and equipped to rush to the scene of a mine disaster anywhere in the state with complete equipment to outfit two six-man rescue teams.

(2) **Maintenance shops** carrying tools for repairing all its equipment, as well as a battery charger for the electric cap lamps and an oxygen pump for filling oxygen cylinders.

(3) **Roving classrooms** in which first aid and mine rescue technique is taught.

(4) **Portable laboratories** for the testing of mine air, rock dust samples, and safety lamps.

(5) **Emergency hospitals and ambulances.** Extensive first-aid equipment, inhalators, and stretchers are carried.

Search for Wisconsin Copper

A U. S. Bureau of Mines crew recently began drilling on the old Weyerhaeuser copper property in Douglas County, Wis., 14 miles east of the little town of Gordon and 60 miles southeast of Superior. The Douglas County deposits are believed similar in mineralization to the famous copper deposits in the northern Michigan peninsula.

The Bureau crew will drill from two to four holes in the D lode area to substantiate the findings of previous industry drilling and to obtain enough core to determine the grade and extent of mineralization. The Bureau made a preliminary examination of the Douglas County property in 1943. This was followed by extensive trenching in 1944 and 1945.

Copper was first reported discovered in Douglas County in the late 1890's. Small-scale prospecting was conducted intermittently for the next 16 years, and a shaft was sunk.

In 1906, the Rudolph Land Co. acquired the property, and is reported to have spent about $150,000 for exploration and development over a seven-year period. About 55 holes totaling 19,374 ft were drilled, three shafts and an underground development were excavated, and a small test mill was erected. This program ended in 1914. Though a few thousand pounds of copper were obtained, no commercial production was recorded.

No further mining activity occurred in the area until 1943, when the presence of copper mineralization in old dumps in Douglas County was reported to the Bureau.

Float Dock to Venezuela

By building an iron ore dock at Orange, Texas, and then floating it to Puerto Ordaz, Venezuelan ore terminal of United States Steel's Orinoco Mining Co., many months will be saved in construction of the ore transfer facilities in Venezuela.

The dock, more than 1/5 of a mile long, will be made up of steel sections built in Texas and floated across the Gulf of Mexico, into the Caribbean Sea, then through the Gulf of Paria, and up the Orinoco River to Puerto Ordaz. Each dock section, in the form of a barge, measures 82 ft wide, 376 ft long and 15 ft deep. The weight of each section is 2250 tons. Of the three sections to be built, one was launched in April and has completed the trip.

U. S. Steel is the first steel producer to undertake the prefabrication of an ore dock.

Ore Transport Sets Record

On her maiden voyage on the Great Lakes, the steamer *Arthur M. Anderson* carried a cargo of 20,087 gross tons of iron ore to Gary, Ind. This sets a new record in the 51-year history of the Pittsburgh Steamship fleet. Iron ore cargoes are measured in gross or long tons of 2240 lb.

The *Arthur M. Anderson* is part of the Pittsburgh Steamship line, which is making every effort to build a stockpile of iron ore for operation of the blast furnaces during the winter when the Great Lakes ore fleets are tied up.

New Plant For United Electric

The United Electric Coal Cos., Chicago, has awarded Nelson L. Davis Co. a contract to design and equip a coal cleaning plant at its Buckheart Mine, near Canton, Ill.

The new plant will clean coal by the dense media float and sink process with a raw coal feed capacity of 1000 tph, of which 850 tph will be treated by dense media, while 150 tph will be handled by the present fine coal cleaning plant. In addition 200 tons of rejects per hour from the primary separation will be retreated for additional recovery by dense media.

A new settling cone will be installed for the purpose of improving clarification of plant process water and to reduce sludge losses to the existing settling pond.

This plant is scheduled for completion in the late summer or early autumn of 1953.

More Iron From Michigan

A new blast furnace will be under construction shortly on part of a 658-acre site on the St. Clair river, 2½ miles south of St. Clair, Mich. A coke oven will also be built there. The installation, it is estimated, will produce 300,000 tons of merchant pig iron and 350,000 tons of coke annually. The blast furnace is expected to be in production early in 1954 according to Frank J. McLaughlin, president of the Michigan Iron and Coke Co., operators.

Raw materials for the furnace will be delivered principally by boat. Construction is being started on a new boat slip capable of unloading two 600-ft lake freighters simultaneously.

BOOK REVIEW

MAC QUOWN DIRECTORY AND HANDBOOK OF ANTHRACITE, *National Coal Publications, 1201 Berger Bldg., Pittsburgh 19, Pa. $10.*

THIS is the tenth edition of the directory which was established in 1932. It includes information on coal companies active in the production of and sale of anthracite. A map of the anthracite field is included.

WIRE ROPES IN MINES, INSTITUTION OF MINING AND METALLURGY, *Salisbury Circus, London E. C. 2. $7.00. 828 pp.*

THIS volume contains 18 papers on the manufacture and properties of rope wire and wire ropes, wire rope practice in Britain, Ontario, the Witwatersand, the U. S. A., South India, Australia, France, Belgium, the Netherlands and Germany. It thoroughly covers the subject of wire rope usage and belongs on the desk of anyone concerned with hoistings.

Midvale's Golden Anniversary

More than 1200 persons turned out at Midvale, Utah to celebrate the 50th anniversary of the oldest operating smelter in Utah. The plant is operated by the United States Smelting Refining and Mining Co.

Principal speaker of the day was the Governor of Utah, J. Bracken Lee, who spoke on labor-management relations.

According to C. A. Nelson, superintendent of the smelter, employes now working at the plant have a total of 7819 years of "milling and smelting 'knowhow.'" . . . . "As of today, capital investment in the smelter exceeds $10,500,000 or an investment of $23,000 for each employe," he said.

In its 50-year history, the smelter has reduced 11,000,000 tons of ore, recovering 1,500,000 tons of lead, 1,000,000 tons of zinc, 150,000,000 ounces of silver and 1,500,000 ounces of gold, along with lesser metals, Nelson remarked.

W. C. Page, vice-president and general western manager, said the Midvale smelter was the oldest operating smelter in the state, although it was the third one built. Once there were over 40 smelters where there are now only three operating in the state.

Quicksilver Shaft Reopened

Worked intermittently since 1872, the Rinconada quicksilver mine, 12 miles southeast of Santa Margarita, Calif., is again in production. It was reopened early in 1951 by George P. Bell, when the price of mercury began to advance. The rotary furnace has been reconditioned and a retort installed. The main orebody has been developed to about 500 ft below the surface.

Ship Smelter Flux

Small shipments of gold-silver siliceous ore are being made to the Ajo smelter of Phelps Dodge Corp. from the Allison mine, about 22 miles south of Sells, Ariz. The mine, owned by Tom Reed Gold Mining Co., is operated under lease by Morris Hederman and Odin Dodd of Tucson. They are employing 12 men and producing about 16 tons a day. The operators expect to double production very shortly. V. R. Calloway and Jack Ballam are mining about 30 tons of low-grade copper-silver ore daily at the Calloway mine, five miles north of Covered Wells, Ariz. They have three men working, mining by means of a loader and truck. They are also trucking the ore to Ajo. The operators are planning for additional equipment—a shovel or dragline—so that production can be increased to 50 tons daily. Ore from both these operations though low grade is high in silica and is in demand as a flux.

Plan Asbestos Operation

It is reported that the Alonzo Mining and Milling Co. is constructing a plant near Hernandez, Calif., for processing asbestos. The plant is located near the asbestos deposits in southern San Benito County, in the Clear Creek area of the coast range.

Build Custom Mill

Installation of a ball mill to treat 100 tons of ore daily has been completed at the tungsten plant being constructed at Lackawanna Springs, on the outskirts of Ely, Nev. Jigs, concentration tables and flotation units are being moved to the plant from Hailey, Idaho, and milling of tungsten ore was expected to start in mid-July.

Designed to treat scheelite, the mill may be provided with equipment to handle other ores. It is the first tungsten concentration plant at Ely and will process ore mined by several operators within a 400-mile radius. Baltimore-Camas Mines is developing tungsten properties in Nevada and Utah and plans treatment of scheelite from a number of independent producers.

Oregon Uranium Samples

The U. S. Bureau of Mines Laboratory at Albany, Ore. has reported that the richest and most promising samples of uranium-bearing ores ever analyzed at the laboratory have interested the Atomic Energy Commission. They were submitted by Mertin E. Oakes, a Portland building contractor, who mixes prospecting with hunting. He is keeping the source of the samples a secret.

Gold Mine Burns

A gold mine on Mt. Ashland, in Oregon, owned by Lawrence Wilson, was severely damaged in a recent fire. Among the equipment destroyed by fire was much new machinery and mining equipment.

Improve Mexican Mine Roads

In a move to aid the Mexican mining industry, which has shown indications of a falling off in production, the Mexican Government has announced plans for the construction of a vast chain of roads to link the country. These secondary, cross-country roads will aid in the more rapid movement of minerals from mines to processing plants, and for export, a spokesman said.

According to the Department of the Treasury and Public Credits, the roads will be subsidized by the Mexican Federal Government. The plan is to take funds collected in taxes from mining firms and invest these in the development of the road program. While the construction is primarily planned to aid the mining industry, officials point out that the project will also have vast social and economic repercussions. Towns situated between mining properties will benefit from the new roads which will lead to existing main national highways.

Mining circles have received the news of the huge program with approval, for the opinion is that once the project is realized, it will give strong impetus to mining activities in the country. Actually, many mines are currently not operating precisely because of the lack of facile communications in many areas of the Republic.

To Reveal Air Search Results

The Atomic Energy Commission has announced that it will make public the result of its "airborne" detector search for radioactive minerals. Starting July 15, and each month thereafter, the commission announced, index maps showing the location of areas which may have a uranium potential will be posted at designated offices, such as the exploration branch offices of the commission at Salt Lake City, Grand Junction and Denver, and the several sub-offices of these major offices.

Prospectors are cautioned that the information will relate only to locations at which anomalous radioactivity has been observed from the air. Such recordings do not guarantee sources of uranium which may be commercially mined.

Manganese Depot For Arizona

The General Services Administration plans to establish a purchasing depot for manganese ore at Worden, Ariz., according to Jess Larson, administrator of GSA. Ore bought at the depot must contain a minimum of 15 percent manganese and each shipment must consist of at least five long tons of ore. Purpose of the depot is to stimulate domestic production of manganese. Depots already have been setup at Butte and Philipsburg in Mont. and Deming, N. M.

Approve Huge Dredge Project

Reversing an earlier decision, the Oregon land board recently approved the application of S. K. Atkinson, Boise, Idaho mining engineer, to conduct a large dredging project in the Hells Canyon area of the Snake River. The area to be worked extends down river for 32 miles from a point about 10 miles north of Weiser, Idaho. Atkinson expects to recover gold, monazite sand and other minerals from the gravels in the river.

Explore Northport District

Grandview Mines has begun exploratory drilling in the Northport district of Stevens County, Wash. Churn drilling commenced in the area between the Anderson and Admiral Consolidated mines. Grandview is also doing a considerable amount of bulldozer stripping in the area as well as road building. Mineral rights were obtained by the company on extensive areas of land in this district during the last two years.

Test Uranium Miners Health

Examinations of over 1000 workers in uranium mines and mills in Colorado, Utah, New Mexico and Arizona have revealed no evidence of health damage from radioactivity to the men, it has been announced by the U. S. Public Health Service. When investigators found dangerous amounts of radiation, it was said, the mine operators were immediately advised not only of the levels of radiation in the mines, but also to improve ventilation and reduce the dust count in their mines.

The examinations were part of a study of occupational health conditions in the uranium mining industry that has been going on since 1950 and is to continue for several years. Cooperating with the industry in the study are the Public Health Service, the Atomic Energy Commission, the U. S. Bureau of Mines, the Los Alamos Scientific Laboratory, the Bureau of Standards and the health departments of the four states. The study also showed that the problem of silicosis is not acute in the uranium mines.

Action at Black Rock

Rejuvenated early in 1951 by Black Rock Desert Mineral Co., following a long period of idleness, the Black Rock property at Sulphur, Nev., 60 miles west of Winnemucca, is developing into one of the nation's important sulphur producers. The company is increasing mill capacity from 80 to 400 tons a day and is installing a refining unit designed to produce 125 tons of pure chemical product daily which will be shipped to sulphuric acid producers.

Camp buildings have been erected, accommodations provided for families and mining operations accelerated. Full extent of the deposit is not known but is is estimated to be the second largest of its type in the country.

Oro Flame Plans Mill

The Oro Flame Mining Co. is making plans for mill construction at the old Oro Flame mine, 12 miles south of Prescott, Ariz., following a year and one-half of development work. A considerable tonnage of copper-gold-silver ore has been blocked out and development work and drilling are continuing. H. K. Grove is mine superintendent.

Plan to Build Dredge

Construction of a dredge at Placeritos, Nev., north of Lovelock, is scheduled by Gold of Ophir Placers, according to V. C. Frazier, general manager. He reported churn drilling has disclosed a large amount of gravel carrying gold at depths of from six to 18 ft.

Is Death Valley Sinking?

Topographic mapping parties of the Geological Survey working in Death Valley last winter established elevations indicating that the low spot of the United States and, in fact, the entire Western Hemisphere, is two ft lower than was formerly supposed.

The general location has not changed, being just west of Badwater, Calif., where a Geological Survey bench mark, established in 1937, shows an elevation of 279.324 ft below sea level. This is still the lowest bench mark recorded in more than 70 years of mapping activities by the Survey. The National Park Service folder on the Death Valley National Monument has for years used an elevation of minus 280 ft for the lowest point, just west of this mark.

In mapping the area J. T. Long of the Geological Survey office in Sacramento, Calif., found that the 280-ft contour (below sea level, that is) extended about six miles to the northwest of Badwater and included an area of about ten sq miles. The lowest elevation determined within this area was —281.9 ft, and the Bennetts Well quadrangle map will show this as a spot elevation of —282 ft about four miles west and one mile north of the bench mark at Badwater. The Furnace Creek quadrangle to the north will show another spot of the same elevation about three miles north of Badwater and half a mile west of the road.

Operators Corner

(Continued from page 50)

of many abandoned deep mines, and several Pennsylvania communities get their water supply from such sources.

Keep Pits Dry

With few exceptions, these principles can be followed in any of the coal fields in the United States. A few cases have come up where the thickness of some of the sulfur-bearing formations was so great that it would be impossible to fulfill every rule so far established. But operation of a dry pit is possible in any strip, and so most of the stream contamination is preventable now. The amount of acid carried out of any coal mining operation is closely proportional to the volume of water flow—high in wet weather and low in dry weather. A working area where you don't get your feet wet will not pollute any stream.

Experimental strip mines have shown that any legislation designed at protecting streams must be flexible rather than detailed and rigid. The general principles will work everywhere, but each mine presents a slightly different problem. One operator was able to cut his back-filling expense in half by filling his strip in the shape of a shallow valley with a definite downward slope throughout its length. The sulfuritic material was buried under clay as usual, more than 15 ft below the shallowest point of his "valley." Thus, the water runoff was rapid, down the length of the "valley" and out of the area, and had no time to soak in.

Although in the above-mentioned case, the cost of the more expensive method of back-filling would only have equalled the amount of the operator's bond, allowing him to use a more economical method actually achieved a more effective land restoration.

New Uranium Sources Cited

The Atomic Energy Commission, in its twelfth semi-annual report, has disclosed that new sources of raw materials will be drawn upon to support its accelerated expansion and development program. The report pointed out that domestic production of uranium "is increasing and new sources, both foreign and domestic, are nearly ready for initial production." For the second successive six-month period, the commission announced an increase in the receipts of uranium concentrates.

Ore is expected to be received in increased amounts from foreign sources as a result of the expansion of Canadian facilities at the Eldorado mine on Great Bear Lake in northwestern Canada. The first of several plants to recover uranium from the gold ores of the Witwatersrand near Johannesburg, South Africa, "is nearly ready to start production." For the first time the AEC has mentioned Australia as a source of uranium when it said, "an agreement was reached with Australia to supply uranium to the United States." The sources of the uranium were not disclosed.

On the domestic scene it was announced that "ore processing capacity was increased and additional production areas are being investigated." Domestic exploration for raw materials is progressing, the commission reported, with the Colorado Plateau showing the greatest promise, although some new uranium ore has been discovered in the Black Hills of South Dakota. More than 1,000,000 ft of AEC sponsored drilling was accomplished during the fiscal year ending June 30. Approximately 1,500,000 ft of drilling is planned for the fiscal year, 1953. Private mining interests also are increasing their drilling programs.

The report cites other significant examples of the intensified drive to develop new sources of uranium. In order to open up the all but inaccessible Colorado Plateau, the heart of America's uranium production, $4,200,000 has been spent in constructing 783 miles of access roads. More than $600,000 was paid out in bonus premiums, which have been available since early 1951, on the first 10,000 tons of uranium to be obtained from a new property.

A significant new domestic source of uranium are the phosphate fields of this country. It was reported that construction of the first plant to recover uranium from phosphoric acid is nearing completion. It is under construction by the Blockson Chemical Co., near Joliet, Ill.

Install New Antimony Furnace

A new reverberatory furnace, with an approximate capacity of 50 tons of ore daily, is being erected at the Last Chance antimony mine in Wall Canyon, near Round Mountain, Nev. Controlled and operated by Last Chance Mining Co., the property is being provided with a new headframe, ore bins and mine buildings. The new ore reduction plant was ordered after thorough testing of the ore.

Nancy Lee and the New Era

Nancy Lee Mines, Inc., reported that it is planning to transfer its Pine Creek, Idaho, holdings to a new corporation, New Era Mines, for deep development. It reports a long-term royalty contract submitted by an operator for "the development of this property without cost to New Era Mines or Nancy Lee."

Copper Mine Opened

Operations are proceeding at the Eldorado copper mine northeast of Lincoln, Calif., where some shipping grade ore was developed last year. The property was drilled in 1944 by the U. S. Bureau of Mines and ore containing copper sulphides, gold and silver located. Several copper producers operated in the area 70 years ago.

Mine More Clay

The Dragon Consolidated Mining Co., plans to increase its production of halloysite clays to more than 7000 tons a month, James J. Lillie, vice-president of the firm has announced. Production has been running at an average of 4000 tons a month for the past year. Clay from the mine located in the Eureka district of Utah is sold to Filtrol Corp.

Of the 7000 tons, about 1000 tons would be mined monthly from new open pit operations at the Dragon mine. The remainder of the production will come from workings on the 175-ft level and below. As stripping continues on the open pit, greater amounts of the clay will be produced from the surface operation. Lillie has also confirmed reports that Dragon had encountered a new source of the clay on the eastern rim of the pit, below the old iron mine.

Underground operations are being carried out by conventional square set mining, with ore from the 175-ft level being transferred to the 300-ft level for haulage. Some mining and development work is being carried out on the 300-ft level. Two power shovels loading trucks are moving overburden and ore from the open pit. Approximately 80 men are employed at the operation.

AEC Seeks Men

The Atomic Energy Commission seeks top-level metallurgical engineers with professional training and operating experience in ore processing. Positions involve administration of uranium production programs. Salary range $7,000-$10,000. Positions are located in Washington, D. C., and in the field. Interested applicants should address inquiries to George M. Gableman, Chief, Personnel Operations, 1901 Constitution Avenue, N. W., Washington 25, D. C., and enclose a background statement.

Building at Mohawk Mine

Activity is increasing at the Mohawk silver mine in the Silver Peak district near Goldfield, Nev. Erection of several more buildings has begun, including accommodations for 20 men. Development of an orebody discovered last year is reported progressing with favorable results. The vein has been exposed for more than 150 ft. It varies in width from six to twelve ft. Ore is sent to the leased Silver Peak mill.

Chrome Producers Organize

A new mining group to be known as the Cal-Ore Chrome Producers Committee of the Oregon Mining Association, J. R. Holman, chairman, has announced a meeting schedule and reports that an executive office will be set up in Grants Pass, Ore., with Bill Robb, Jr. as executive secretary.

Plan New Uranium Laboratory

Plans and specifications of a new mill-control laboratory at the Atomic Energy Commission's mill at Monticello, Utah, have been made available to contractors, according to the Walker-Lybarger Construction Co., prime contractors for the AEC in the Colorado Plateau area. The laboratory, which will contain 1500 sq ft, will be of reinforced concrete and masonry construction. It will replace an assay plant that burned down last May.

Safety In Black Caving

(Continued from page 34)

manner, 75 percent of the raising and coning of raises is eliminated. Scraping does not interfere with the undercutting, as the undercut is retreating away from the main scraping raise. To make this operation safe, a screen guard is used in front of the men drilling the undercut to protect them from being hit by the pull back rope in case it breaks or becomes disengaged from the back of the scraper.

Safety Gains Enumerated

Numerous safety features have resulted from the use of circular steel nets in the development and undercutting of block caving areas:

Drift Development:

(1) Less weight has to be handled per piece of support. Each piece of steel is approximately 120 lb against 200 lb per piece of wood timber. This reduces the chances of hernias and strained backs.

(2) Development time is only 60 percent with steel as against wood in ore and 40 percent with steel as against wood in rock. This is quite important when you consider the man hours of exposure eliminated.

(3) The drift is excavated as a circle instead of a square section, making it stronger in itself and greatly reducing the spalling of large chunks from the back and sides.

(4) The drift has only one-half of the cross-sectional area of the timbered drift, making it more stable, especially in poor ground.

(5) The H-beams used on the top of the steel make it possible to hang the cap and do a better job of covering the back of the drift immediately after blasting.

(6) The strength of the circular steel sets is much greater than that of the wood, reducing breakdowns and eliminating a considerable amount of hazardous repair work.

Raise Development & Undercutting:

(1) The use of a single brow cap strapped to the circular steel set at the mill raise eliminates opening the sides of the drifts for a full set of timber.

(2) The mill raise can be kept in better shape, as the brow cap, strapped to the steel, will stay in position a longer time and can be replaced more easily.

(3) Undercutting from inside the steel sets eliminates naked raising and coning of mill raises from inside these raises.

(4) Due to the small size of the drift and the low height of the mill raises there is less chance of the scraper men being hit by chunks when the ore is coming from the mill raises.

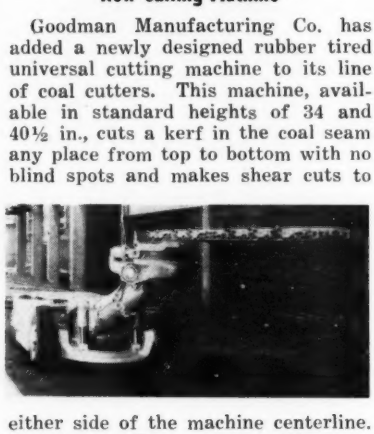
(5) It is possible to do a better job of blocking the mill raises as the blocking can be placed inside the web of the steel.

Use of circular steel sets has speeded operations in block caving and has reduced the hazards connected with this type of mining.

Manufacturers Forum

New Cutting Machine

Goodman Manufacturing Co. has added a newly designed rubber tired universal cutting machine to its line of coal cutters. This machine, available in standard heights of 34 and 40½ in., cuts a kerf in the coal seam any place from top to bottom with no blind spots and makes shear cuts to



either side of the machine centerline. Cutter bar roll-over is 185° either way from a right-hand shearing position. The horizontal swing of the cutting element on the lower machine is 45° to either side, on the high machine it is 40°. All operations of the machine, except the cutter chain drive, are hydraulically driven. Wheelbase is 90 in. Where desirable to have tire sizes suitable for interchangeability with those on shuttle cars, tires larger than those normally furnished can be supplied with a corresponding increase in the over-all height of the machine.

Metal Sawing Tools

DeWalt equipment manufactured by a subsidiary of American Machine and Foundry Co., occupies a somewhat unique position in the field of dry cutting of metals. The manufacturers claim it does a clean and rapid job within rated capacity at a remarkably low cost.

The complete line of DeWalt Radical Arm Saws is suitable for non-ferrous metal cutting, while the heavier machines, from three hp up, have been successful on ferrous and alloy materials in addition to their full range of other applications.

The DeWalt ME-1 cut-off and ME-2F foundry trimming machines were developed *specially* to handle reasonably heavy ferrous and non-ferrous cutting with utmost economy as well ease and speed of operation. The ME-6 dual-column machine, it is claimed, will handle all but the heaviest work with perfect simplicity at an installation cost far below that of competitive models.

For descriptive literature write DeWalt, Inc., Lancaster, Pa.

Announce New Line of Tapes

A new and complete line of electrical tapes has been introduced by Ideal Industries, Inc., 1963 Park Ave., Sycamore, Ill. These include a four-coated, ravel-free friction tape; a quick-fusing, high-dielectric rubber tape; and a two-in-one plastic tape.

The new Ideal Plastic Electrical Tape provides both insulation and protection against weather and mechanical abuse. The strong vinyl plastic body has a dielectric strength of over 8000 v. It is highly resistant to acids, alkalis, corrosive salts, water, oils, greases and alcohols, and is practically impervious to weather according to the manufacturer.

Knee Action Caster

The All Steel Welded Truck Co., Rockford, Ill., has announced a new knee-action, shock-absorbing caster engineered for greater economy, efficiency and safety in a wide variety of handling applications.

Called the Clark Duoflex Caster, it may be used to replace present wheeled equipment as well as with equipment designed for it. All standard wheels are interchangeable.

Users may expect longer equipment life, faster handling, and lower labor costs, according to the manufacturers, who claim the trucks will push from two to four times easier than those with conventional wheels. Reports show large savings in caster maintenance, tire maintenance, replacement, and decreased product damage.

These advantages result from the combination of high deflection with low dynamics and other features of design and construction.

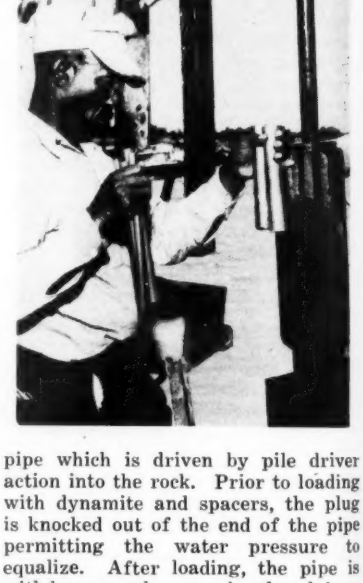
Rated standard capacities are available now in small steps from 50 lb, or less if required, to 1500 lb, or more if required, per caster in the larger standard casters.

The manufacturer will gladly supply additional information to interested readers.

Reduce Dynamite Consumption

According to a report received from Maule Industries, Inc., 1760 Purdy Avenue, Miami Beach, Fla., the use of plastic tubing as spacers in dynamiting operations reduces their dynamite consumption by 30 percent and still retains effective breaking.

Maule Industries' operations are unique in that all their rock comes from under the water down to a depth of approximately 30 ft where it is not practical to drill by conventional methods. Cut lengths of plastic tubing made especially for this application by Irvington Varnish & Insulator Co., are inserted intermittently with dynamite sticks into a plugged-end



pipe which is driven by pile driver action into the rock. Prior to loading with dynamite and spacers, the plug is knocked out of the end of the pipe permitting the water pressure to equalize. After loading, the pipe is withdrawn and a cap is placed in a stick near the top and the charge detonated. No difficulty whatever is experienced in the propogation of the dynamite right to the bottom of the hole.

Samples of these plastic spacers may be obtained by writing directly to the Fibron Division, Irvington Varnish & Insulator Co., Irvington, N. J.

New Oil Extends Engine Life

Shell Rimula Oil, now being marketed by the Shell Oil Co. to a wide range of basic industries, features a combination of additives never before attained on a commercial basis and is designed to substantially extend the serviceable life of automotive type diesel engines as well as certain gasoline engines operating in some industrial stop-and-go, low temperature service.

Shell Rimula Oil was developed by Shell Oil Co. to solve certain problems of engine wear and fouling caused by certain operating conditions that are aggravated by low loads, high sulphur fuels and low temperature operations. These problems had been brought to the attention of Shell scientists by Caterpillar Tractor Co. engineers and a considerable amount of cooperative testing was done during this development. In addition to this, its advantages have since been found most pronounced in certain diesel engines designed for increased power output on low grade fuels.

The company states that higher first cost is offset by extended serviceable engine life by elimination of ring sticking and piston lacquer, with consequent reduction of oil consumption.

Data indicates that Shell Rimula Oil effectively combats sludge and lacquer deposits and extends significantly serviceable life of engines by reducing cylinder, ring, piston, and bearing wear.

Details regarding this product are available from the Shell Oil Company, 50 W. 50th Street, New York, N. Y., or its divisions.

Add Larger Vibrator

A new and larger vibrator has been added to the patented Peterson "Vibrolator" line manufactured by Martin Engineering Co., Kewanee, Ill. The new model, specified as the DV 51, is designed to tackle the feeding problems that arise when larger hoppers and bins are necessary in materials handling.

The DV 51 gives an extremely powerful all-directional vibration that effectively moves materials without damage to the faces of hoppers or bins. It has a two-in. ball that weighs one lb—an increase of 66 percent from the largest model previously manufactured by Martin. Operation is based on the same principle as other Peterson "Vibrolators" with only one moving part, the ball which is pneumatically driven around a stationary hardened and finish-ground two-rail race.

The new model is being used successfully in the movement of all types of materials that must be fed from hoppers and bins including sand, gravel, chemicals, food products, cement, grains, coal, and many other materials that resist movement toward the hopper outlets.

Literature describing the DV 51 "Vibrolator" and its installation are available from the Martin Engineering Co.'s offices at Kewanee, Ill.

Make Larger Scraper

A new 22-yd tractor-drawn scraper, the TC-190, has been announced by Wooldridge Manufacturing Co. of Sunnyvale, Calif. and Chicago, Ill. Said to be designed for use with today's largest tractors, the new model offers capacities of 19.0 cu yds struck and 220 heaped.

Standard new type side cutters of

manganese alloy steel are bolted on to protect bowl side sheets. For rocky terrain and extremely tough material, optional oversized side cutters of extra thickness and strength are available.

The manufacturer reports that the TC-190 was engineered to met specific requests by contractors for a larger scraper with basic characteristics of current models TC-142 and TC-170. Among claimed features are simple cable reeving and long cable life, maneuverability aided by low gravity center with high ground and yoke clearance, and extreme ruggedness.

Further information is available by requesting Bulletin No. TC-250 from Wooldridge Manufacturing Co., Sunnyvale, Calif., or 5345 N. Winthrop Ave., Chicago 40, Ill.

For Better Battery Upkeep

Gould-National Batteries, Inc., offers a two-color 17 by 32-in. check-chart designed to improve the maintenance of motive power batteries. The check-chart tabulates the procedures to follow in the five basic maintenance operations and shows how often each should be done. The chart, a new addition to the Plus-Performance Plan for conserving and increasing battery power, standardizes battery care, makes the battery man's job easier, helps train new maintenance men, and assures continuous battery care.

Illustrated with five cartoons, it esablishes rules to follow in charging, adding water, keeping records, cleaning batteries, and handling them safely, easily, and efficiently—the care that insures longer battery life and dependable performance.

For copies of the check-chart write Gould-National Batteries, Inc., Trenton 7, N. J.

— *Announcements* —

The **Jeffrey Manufacturing Co.**, Columbus, Ohio announces recent changes in its district office personnel: **Carl Verhine** of the Columbus office has been added to the Milwaukee sales staff: **J. A. Lowry** has been transferred to the home office from New York; and **Elmer Longnecker** goes to Detroit from the Columbus district office, replacing **Robert Monsarrat** who has been named manager of the Philadelphia district office.

Edward B. Blanc has been appointed sales engineer for the Drill Steel Div. of the **Crucible Steel Co.** of America. An experienced operating man himself, Blanc will serve Crucible's drill steel customers in the eastern half of the United States.

Allis-Chalmers Mfg. Co., Milwaukee, Wis., recently announced plans to expand the Springfield, Ill., Works, Tractor Division. Preliminary plans are being drawn and construction is scheduled to begin this summer.

National Mine Service Co. announces the formation of an Ashland Division, with headquarters and plant at Ashland, Ky. This new division will specialize in the rebuilding of Joy shuttle cars, cutting machines, loading machines and other mining equipment.

Jack Donahoe has joined **Long Super Mine Car Co., Inc.** as sales engineer, according to an announcement by J. B. Long, president of the company. A native of West Virginia, Donahoe was employed by the New River Co. prior to World War II. Discharged after 5½ years' Army service, he became manager of the Donahoe Electric Co.—a position he held until coming with the Long organization.

CATALOGS AND BULLETINS

DOUBLE REDUCTION SPUR GEAR. *Atlas Car & Manufacturing Co., 1100 Ivanhoe Road, Cleveland, Ohio.* This bulletin covers application of the Atlas Double Reduction Spur Gear Drive for use in Atlas locomotives for coal and metal mining, tunnel driving, and intra-plant use. Advantages of permanent gear alignment, resulting in longer gear life, are described along with reference to stronger housing design and continuous splash-type lubrication for all moving drive parts.

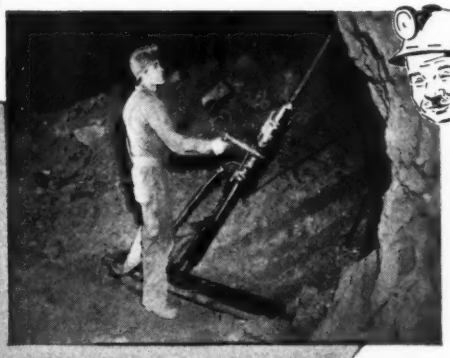
Also covered are the power savings made possible with the use of higher gear ratios between motor and axle to produce greater drawbar pull with less drain on the battery. The series motors are underloaded and operate at higher speeds, reducing the discharge rate of the batteries for longer battery life.

Illustrations show the drive disassembled and include a schematic view of the main axle gear centered between the bearings. A copy of the Atlas Double Reduction Spur Gear Drive specification sheet may be obtained by writing to the company.

Index to Advertisers

3 way gear-up...

with the GARDNER-DENVER RB STOPER

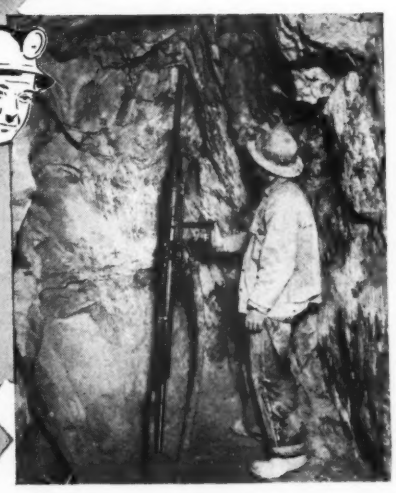


puts your drill runners in high gear

Lets them drill more footage—produce more ore—thanks to perfect balance, easy holding characteristics, fast penetration, and automatic cleaning that eliminates clogged air screens.

meshes with your foremen's safety program

Helps them eliminate dry drilling. The desirable water-on—air-on—air-off—water-off cycle is automatically assured by the single throttle control valve.



won't clash with your drill doctor's schedule

The RB stays down in the stope between routine inspections—thanks to tough construction and the automatic air flow that constantly keeps sludge and cuttings out of the chuck end.

For greater safety—increased production and lower costs—select the RB Stoper for your mine—either the heavy-duty RB104 or the lightweight RB94. Write today for full details.

SINCE 1859

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., Toronto, Ontario

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS

For Greater Mine Safety— Increased TONNAGE

get first-hand facts on this M·S·A EQUIPMENT

Booth No. 608—Metal Mining Show

Helping your efforts to step up mine production and boost overall mine safety is our job here at M.S.A. You'll see these products, plus many more, at our Booth No. 608—Metal Mining Show. You are cordially invited to come in and visit. We'll be looking for you!

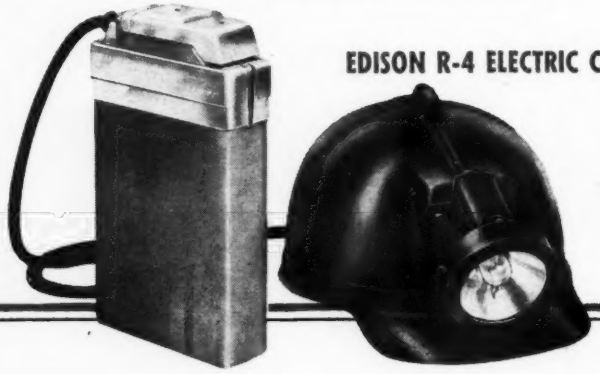
M·S·A MinePhone Communication System

With mechanization increasing production, your haulage system must "keep ahead" to realize maximum tonnage. The M.S.A. MinePhone helps fill this need by providing a modern underground system that maintains continuous trip movements throughout the mine.

The M.S.A. MinePhone brings greater underground safety, too. Track conditions, derailments, or roof falls can be reported immediately. Time-consuming calls to each individual are eliminated—a big advantage in emergencies. You'll find complete details on this modern, two-way voice communication system in our booth.

Let us show you how the M·S·A· Minephone can—

- ★ **Minimize chances of error and accidents.**
- ★ **Coordinate trip traffic for safer, more productive haulage control.**
- ★ **Prevent excessive stop-start strain on haulage equipment.**
- ★ **Maintain control of empties for peak loading efficiency.**
- ★ **Eliminate trip delays.**
- ★ **Reduce frequency of motormen getting on and off trips—save time, avoid injury.**



EDISON R-4 ELECTRIC CAP LAMP—M·S·A COMFO CAP

This popular combination is helping miners bring into play every production advantage of mechanization. The Edison R-4 Lamp is designed to fill your needs for brilliant, unfailing light. Its construction keeps it on the job shift-after-shift, for years. The impact, moisture and oil resistance of the M.S.A. Comfo Cap has been proved in underground operations everywhere. Let us show you how this production-safety team can benefit your operation.

M·S·A SELF-RESCUER

For immediate breathing protection in emergencies caused by fire or explosion, M.S.A. developed the Self-Rescuer. This Bureau of Mines approved safety item provides the precious minutes of emergency breathing protection so vital to the miner while traveling through carbon monoxide to fresh air.

M·S·A PNEOLATOR

This compact, portable unit assures maximum chance of recovery to miners overcome by poisonous gases or asphyxiated from any other causes. Automatically provides oxygen for the lungs at the pre-selected amount and pressure, continuously, effectively, safely. Normal passive return of respiratory muscles produces exhalation.

M·S·A SAFETY EQUIPMENT HEADQUARTERS

MINE SAFETY APPLIANCES CO.

Braddock, Thomas and Meade Sts.
Pittsburgh 8, Pa.

AT YOUR SERVICE:
68 Branch Offices in the United States

MINE SAFETY APPLIANCES CO. OF CANADA, LIMITED
Toronto, Montreal, Calgary, Winnipeg, Vancouver, New Glasgow, N.S.

When you have a safety problem, M·S·A is at your service. Our job is to help you.